

TCS 102

Tactical Control System (TCS)

System/Subsystem Specification



Prepared for:

Program Executive Officer, Cruise Missiles Project
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Prepared by:

Naval Surface Warfare Center-Dahlgren Division
and

Joint Technology Center/System Integration Laboratory, Research Development and Engineering
Center, U.S. Army Missile Command, Redstone Arsenal, AL.

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TCS Program Manager

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Acronym List

ADOCS	Automated Deep Operations Coordination System
ADRG	Arc Digitized Raster Graphic
ADT	Air Data Terminal
AFATDS	Advanced Field Artillery Tactical Data System
AFMSS	Air Force Mission Support System
AIS	Automated Information System
AMPS	Aviation Mission Planning System
ASAS	All Source Analysis System
ASD	Assistant Secretary of Defense
ATCSS	Army Tactical Command Control System
ATHS	Automated Target Hand-off System
ATO	Air Tasking Order
ATWCS	Advanced Tactical Weapons Control Station
AV	Air Vehicle
BITE	Built In Test Equipment
C4I	Command, Control, Communication, Computer, and Intelligence
CADRG	Compressed Arc Digitized Raster Graphic
CARS	Common Automated Recovery System
CARS	Contingency Airborne Reconnaissance System
CCTV	Closed Circuit Television
CD ROM	Compact Disk Read Only Memory
CIGSS	Common Imagery Ground/Surface System
COMSEC	Computer Security
COMPASS	Common Operational Modeling, Planning, and Simulation System
COSIP	Computer Open Systems Interface Processor
COTS	Commercial-Off-The-Shelf
CSC	Computer Software Component
CSCIs	Computer Software Configuration Items
CSU	Computer Software Unit
DCN	Document Control Number
DFAD	Digital Feature Analysis Data
DII/COE	Defense Information Infrastructure/Common Operating Environment
DoD	Department of Defense
DS	Data Server
DTED	Digital Terrain Elevation Data
EMI	Electromagnetic Interference
EO	Electro-Optic
ETRAC	Enhanced Tactical Radar Correlator
EW	Electronic Warfare

FAA	Federal Aviation Administration
FATDS	Field Artillery Tactical Data System
FD/L	Fault Detection / Location
FIPS	Federal Information Processing Standard
GCCS	Global Command and Control Systems
GCS	Ground Control Station
GCS/ACS	Guardrail Common Sensor/Aerial Common Sensor
GDT	Ground Data Terminal
GFE	Government Furnished Equipment
GPS	Global Positioning System
GSM/CGS	Ground Station Module/Common Ground Station
HAE	High Altitude and Endurance
HCI	Human-Computer Interface
HDD	Hardware Design Document
HFE	Human Factors Engineering
HWCIs	Hardware Configuration Items
IAS	Intelligence Analysis System
IAW	In Accordance With
IBLS	Integrity Beacon Landing System
IDD	Interface Design Description
IEEE	Institute of Electrical and Electronics Engineers
I/F	Interface
IFF	Identification Friend or Foe
ILSP	Integrated Logistics Support Plan
INS	Inertial Navigation System
IPF	Integrated Processing Facility
IR	Infrared
IRS	Interface Requirements Specifications
JMCIS	Joint Maritime Command Information System
JMF	Joint Message Format
JPO	Joint Project Office
JROC	Joint Requirements Oversight Council
JSIPS-N	Joint Service Imagery Processing System - Navy
JSTARS	Joint Standoff Target Attack Radar System
JTA	Joint Technical Architecture
LOL	Loss of Link
LOS	Line of Sight
LRIP	Low Rate Initial Production
LRP	Launch and Recovery Point
LRU	Line Replaceable Unit
MAE	Medium Altitude and Endurance
MGRS	Military Grid Reference System

MIES	Modernized Imagery Exploitation System
MOPP	Mission Oriented Protective Posture
MTBF	Mean Time Between Failure
MTTR	Mean Time To Repair
NDI	Non-Developmental Items
NIST	National Institute for Standard Technology
NITF	National Imagery Transmission Format
NRT	Near-Real Time
ORD	Operational Requirements Document
OT	Operate Time
POL	Petroleum, Oil, Lubricants
RAID	Redundant Array of Inexpensive Disk
SAR	Synthetic Aperture Radar
SATCOM	Satellite Communication
SPIRIT	Special Purpose Integrated Remote Intelligence Terminal
SPTE	Special Purpose Test Equipment
SRS	Software Requirements Specification
SSDD	System/Subsystem Design Document
SSS	System / Subsystem Specification
ST	Stand-by Time
TACCOM	Tactical Communications
TALDT	Total Administrative and Logistic Downtime
TAMPS	Tactical Aircraft Mission Planning System
TBD	To Be Determined
TBMCS	Theater Battle Management Core System
TCM	Total Corrective Maintenance
TCS	Tactical Control System
TCSEC	Trusted Computer Security Evaluation Criteria
TEG	Tactical Exploitation Group
TMDE	Test, Measurement, and Diagnostic Equipment
TPM	Total Preventative Maintenance
TUAV	Tactical Unmanned Aerial Vehicle
UAV	Unmanned Aerial Vehicle
UHF	Ultra High Frequency
USAF	United States Air Force
USIS	United States Imagery Standards
USMTF	United States Message Text Format
UTM	Universal Transverse Mercator
VCR	Video Cassette Recorder
VDD	Version Description Document
VHF	Very High Frequency
VMF	Variable Message Format

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TCS 102

Chapter 1 Scope

1.1 Identification

This TACTICAL CONTROL SYSTEM (TCS) - SYSTEM / SUBSYSTEM SPECIFICATION (SSS) - VERSION 1.0 identifies, specifies, and establishes the detailed system requirements for the Tactical Control System as set forth by the OPERATIONAL REQUIREMENTS DOCUMENT FOR THE UNMANNED AERIAL VEHICLE (UAV) TACTICAL CONTROL SYSTEM (TCS) - VERSION 5.0. The SSS further specifies the methods to be used to ensure that each requirement has been met. Requirements pertaining to the TCS external interfaces are covered in separate Interface Design Descriptions (IDDs) to be published. The SSS is published IAW DID DI-IPSC-81431, dated 941205. This SSS will be revised at the conclusion of the Program Definition and Risk Reduction period of the TCS program and will be re-issued as the TCS Product Specification to be used during the follow-on TCS Engineering and Manufacturing Development period.

1.2 System Overview

The purpose of the TCS is to provide the military services with a single command, control, data receipt, data processing, data export and dissemination system that is interoperable with the family of all present and future tactical unmanned aerial vehicles. These UAVs shall include the Tactical Unmanned Aerial Vehicle (TUAV) and the Medium Altitude and Endurance (MAE) UAV (henceforth referred to as Outrider and Predator respectively), their associated payloads, and other network communication systems. TCS will also be capable of receiving and processing information from High Altitude and Endurance (HAE) UAVs, their associated payloads, future development UAVs and payloads.

1.2.1 TCS Program, Phases, and UAV Interaction

The Unmanned Aerial Vehicle Joint Project Office (UAV JPO) has undertaken development of a TCS for UAVs. Design and development of the TCS will be conducted in two phases. Phase 1 is defined as the Program Definition and Risk Reduction phase, and Phase 2 is defined as the Engineering and Manufacturing Development phase in accordance with Department Of Defense Instruction (DODI) - 5000.2R. During Phase 2, TCS Low Rate Initial Production (LRIP) will commence. Phase 1 will be a 24 month period and will demonstrate Level 1 through Level 5 interaction (as defined below) in an Incremental and Evolutionary strategy as described in accordance with MIL-STD-498. The five discrete levels of multiple UAV interaction to be provided by the TCS are:

Level 1: receipt and transmission of secondary imagery and/or data

Level 2: direct receipt of imagery and/or data

Level 3: control of the UAV payload in addition to direct receipt of imagery/data

Level 4: control of the UAV, less launch and recovery, plus all the functions of level three

Level 5: capability to have full function and control of the UAV from takeoff to landing

1.2.2 Tactical Control System

The TCS consists of the software, software-related hardware and the extra ground support hardware necessary for the control of the Outrider, and the Predator UAV, and future tactical UAVs. The TCS will also provide connectivity to specifically identified Command, Control, Communications, Computers, and Intelligence (C4I) systems. TCS will have the objective capability of receiving High Altitude Endurance (HAE) UAV payload information. Although developed as a total package, the TCS will be scaleable to meet the user's requirements for deployment. TCS will provide a common Human-Computer Interface (HCI) for tactical airborne platforms to simplify user operations, training, and facilitate seamless integration into the Services' joint C4I infrastructure across all levels of interaction.

1.2.2.1 Software

The major focus of the TCS program is software. The software will provide the UAV operator the necessary tools for computer related communications, mission tasking, mission planning, mission execution, data receipt, data processing, limited data exploitation, and data dissemination. The software will provide a high resolution computer generated graphical user interface that enables a UAV operator trained on one system to control different types of UAVs or UAV payloads with a minimum of additional training. The TCS will operate in an open architecture and be capable of being hosted on computers that are typically supported by the using Service. Software developed will be Defense Information Infrastructure / Common Operating Environment (DII/COE) compliant, non-proprietary, and the architectural standard for all future tactical UAVs. To the extent possible, the TCS will use standard Department of Defense (DoD) software components to achieve commonality. TCS will provide software portability, scaleable functionality, and support for operational configurations tailored to the users' needs.

1.2.2.2 Hardware

To the extent possible, the TCS will use standard DoD components in order to achieve commonality. The TCS will use the computing hardware specified by the service specific procurement contracts. The individual armed services will identify TCS computing hardware, the desired level of TCS functionality, the battlefield C4I connectivity, and the particular type of air vehicle and payloads to be operated depending upon the deployment concept and area of operations. TCS hardware must be scaleable or modular to meet varying Service needs. TCS hardware will permit long range communications from one TCS to another, data storage expansion, access to other computers to share in processing capability, and multiple external peripherals.

1.2.3 Integration with Joint C4I Systems

TCS integration with C4I systems will be accomplished through development of interfaces that permit information exchange between the TCS and specified C4I systems. TCS will be capable of entering DII/COE compliant networks. Network interoperability will include but not be limited to:

- Advanced Tactical Weapons Control Station (ATWCS)
- Advanced Field Artillery Tactical Data System (AFATDS)
- All Source Analysis System (ASAS)

Automated Deep Operations Co-ordination System (ADOCS)
Automated Target Hand-off System (ATHS)
Closed Circuit Television (CCTV)
Common Operational Modeling, Planning, and Simulation System (COMPASS)
Contingency Airborne Reconnaissance System (CARS)
Enhanced Tactical Radar Correlator (ETRAC)
Guardrail Common Sensor Aerial Common Sensor (ACS) Integrated Processing Facility (IPF)
Intelligence Analysis System (IAS)
Joint Deployable Intelligence Support System (JDISS)
Joint Maritime Command Information System (JMCIS)
Joint Service Imagery Processing System (JSIPS)
Joint Standoff Target Attack Radar System (JSTARS) Ground Station Module/Common Ground Station (GSM/CGS)
Modernized Imagery Exploitation System (MIES)
Service Specific Mission Planners
JSIPS Tactical Exploitation Group (TEG)
Theater Battle Management Core System (TBMCS)
TROJAN Special Purpose Integrated Remote Intelligence Terminal (SPIRIT) II

Table 3.3.1.1-1 shows the planned implementation schedule for C4I interface realization. The TCS will export and disseminate UAV imagery products, tactical communication messages, as well as mission plans and target coordinates. The TCS will also receive, process, and display tasking orders, and operational information from Service specific mission planning systems.

1.2.4 System Compliance

The TCS will be developed in compliance with the following military and commercial computing systems architecture, communications processing, and imagery architecture standards:

- a) Defense Information Infrastructure (DII) / Common Operating Environment (COE)
- b) Computer Open Systems Interface Processor (COSIP)
- c) Common Imagery Ground/Surface System (CIGSS) Handbook
- d) Variable Message Format (VMF) and Joint Message Format (JMF)
- e) National Imagery Transmission Format (NITF)
- f) Assistant Secretary of Defense (ASD) (C3I) Joint Technical Architecture (JTA)

1.3 Document Overview

This section has been tailored out. See Table of Contents.

Chapter 2 Referenced Documents

2.1 Government Documents

Only documents that are directly referred to in this document are included in the document lists.

1. MIL-STD-2500A Military Standard National Imagery Transmission Format (Version 2.0), 18 June 1993.
2. MIL-STD-498 Software Development and Documentation, 5 December 94.
3. Operational Requirements Document for the Unmanned Aerial Vehicle Tactical Control System (Version 5.0)
4. Operational Requirements Document (ORD) for the Tactical Unmanned Aerial Vehicle (TUAV), October 96
5. Operational Requirements Document (ORD) for the Medium Altitude Endurance (MAE) Unmanned Aerial Vehicle, (Not available for publication at this time)
6. Operational Concept Document for Tactical Control System (TCS), 18 February 1997.
7. MIL-STD-1472 Human Engineering Design Criteria for Military Systems, Equipment, and Facilities.
8. MIL STD 882 Safety
9. UAV TCS Program Management Plan (Version 1), 19 February 1997
10. Joint Requirements Oversight Council (JROC) Memorandum, (TBD)
11. TCS - C4I Interface Design Description (IDD) - TCS Document Control Number (DCN)
12. Data Terminal Interface Design Description (IDD) - TCS Document Control Number (DCN)
13. TCS - Printer Interface Design Description (IDD) - TCS Document Control Number (DCN)
14. TCS - External Data Storage Interface Design Description (IDD) - TCS Document Control Number (DCN)
15. AV Standard Interface Design Description (IDD) - TCS Document Control Number (DCN)
16. Data Server Interface Design Description (IDD) - TCS Document Control Number (DCN)
17. SAR Processor Interface Design Description (IDD) - TCS Document Control Number (DCN)
18. Intercom Interface Design Description (IDD) - TCS Document Control Number (DCN)
19. VCR Interface Design Description (IDD) - TCS Document Control Number (DCN) (TBD)
20. Printer Interface Design Description (IDD) - TCS Document Control Number (DCN) (TBD)
21. TCS Master Test Plan, TBD.

2.2 Non-Government Documents

(None)

Chapter 3 Engineering Requirements

The TCS system will be capable of controlling the Predator and Outrider AVs with a single control system, using existing military services standard hardware and software, and supporting interfaces with various C4I systems.

The TCS shall consist of the TCS workstation Hardware Configuration Items (HWCIs), TCS Computer Software Configuration Items (CSCIs), and additional TCS Support HWCIs and CSCIs. [SSS004]

The primary function of the TCS is to provide command and control of the payload, Air Vehicle (AV), data link, and other necessary support equipment in order to employ tactical UAVs to conduct reconnaissance, surveillance, target acquisition, and target identification missions. The TCS will interface with and export and disseminate payload data to military supported units via external (not part of TCS) tactical communications systems, and C4I systems. Communications procedures, formats, and interfaces will be interoperable with selected standard DoD C4I systems, architectures, and protocols.

The operational capabilities to be performed by the system will be determined by task analysis in accordance with MIL STD 1388 Task 401 as a guide based on a thorough understanding of Outrider and Predator mission requirements. Tasks will be evaluated and allocated based on operator skills and proficiencies. The initial TCS task analysis will produce a system baseline which will be optimized by engineering analysis and operator evaluations.

The TCS shall meet the capability criteria, those applicable to the TCS project, established by the Predator ORD and the Outrider ORD. [SSS008] Table 3-1 identifies the Outrider ORD and Predator ORD requirements applicable to TCS.

Table 3-1 Predator and Outrider ORD Applicable Requirements

REQUIREMENT	SOURCE
	Predator ORD
	Outrider ORD

The TCS shall support 5 levels of UAV interaction: [SSS010]

Level 1: receipt and transmission of secondary imagery and/or [as well as] data

Level 2: direct receipt of imagery and/or [as well as] data

Level 3: control of the UAV payload in addition to direct receipt of imagery/data

Level 4: control of the UAV, less launch and recovery, plus all the functions of level three

Level 5: capability to have full function and control of the UAV from takeoff to landing

The TCS system shall provide software capabilities and hardware configurations necessary to fulfill the operational tasking requirements across the 5 levels of interaction. [SSS009]

Table 3-2 identifies the payloads with which the TCS shall be interoperable. [SSS013]

Table 3-2 Interoperable TCS Payloads

PAYLOAD TYPE	UAV
EO/IR	Predator
SAR	Predator
EO/IR	Outrider
	Future

3.1 Required States And Modes

The states of operation of the TCS shall include Startup, Operation, and Shutdown. [SSS014]

The TCS states shall not exist concurrently. [SSS015] Figure 3.1-1 shows the existing states of the TCS.

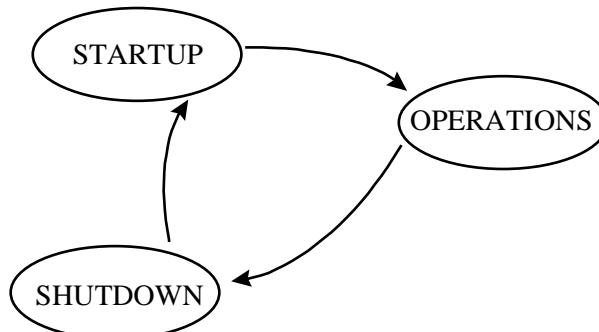


Figure 3.1-1 TCS State Diagram

3.1.1 Startup State

Upon application of power the TCS shall enter the Startup State. [SSS016]

The Startup State shall be comprised of the following modes: Normal Startup Mode and Recovery Startup Mode. [SSS017]

Figure 3.1.1-1 shows the modes that exist in the Startup State.

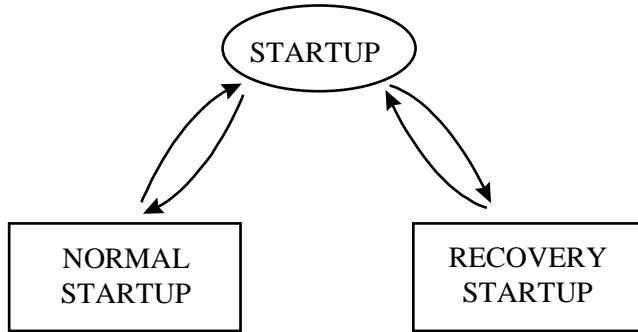


Figure 3.1.1-1 TCS Startup State and Associated Modes Diagram

The TCS will execute the particular startup mode which corresponds with the manner in which the TCS Software was halted.

When the TCS Software is terminated normally the TCS shall enter the Normal Startup Mode of operation upon application of power. [SSS019]

When the TCS software is halted due to an unplanned power interruption as well as abnormal program termination, then the TCS shall enter the Recovery Startup Mode upon application of power. [SSS020]

During startup, the TCS shall determine which of the 5 levels of interaction are achievable by the TCS configuration. [SSS021]

Levels of interaction higher than those achievable by a particular TCS configuration shall be prohibited. [SSS022]

The TCS shall inform the operator if the operator attempts to execute a function prohibited as a result of the determined level of interaction. [SSS023]

3.1.1.1 Normal Startup Mode

When executing in the Normal Startup Mode, the TCS shall provide the system functionality necessary to initialize the system to place it in the Operations State within 60 seconds from the time power is supplied and the TCS application is launched. [SSS024]

Initialization of the TCS HWCI shall include startup of HWCI [SSS542], download of software [SSS026], startup of CSCIs [SSS027], execution of Startup FD/L [SSS025], and establishment of the state of readiness of all interfaces. [SSS028]

3.1.1.2 Recovery Startup Mode

The TCS in the Recovery Startup Mode shall provide the system functionality to resume the Operations State within 45 seconds. [SSS029]

Recovery of the TCS HWCI shall include startup of HWCI [SSS543], download of software [SSS544], startup of CSCIs [SSS545], and establishment of the state of readiness of all interfaces. [SSS546]

The TCS shall be capable of automatically recording system state data, interface communications and other information necessary to support event reconstruction. [SSS528]

For recovery from abnormal termination periods of less than a programmable time (T1), the TCS shall resume the previous Operations State in the functions and use data that was executing prior to the abnormal termination. [SSS030]

For recovery from abnormal termination periods of greater than time T1, TCS shall prompt the operator to select the type of recovery to be executed: (1)Resume in the Same Modes And Data; (2)Resume in the Same Modes but Review and Modify the Command Data as Necessary; or, (3) Perform a Command Shutdown and Startup Via the Normal Startup Mode. [SSS031]

3.1.2 Operations State

When in the Operations State the TCS shall be capable of operating in three modes: normal operations mode, training operations mode, and maintenance operations mode. [SSS032]

Figure 3.1.2-1 shows the Mode Diagram for the Operations State of TCS.

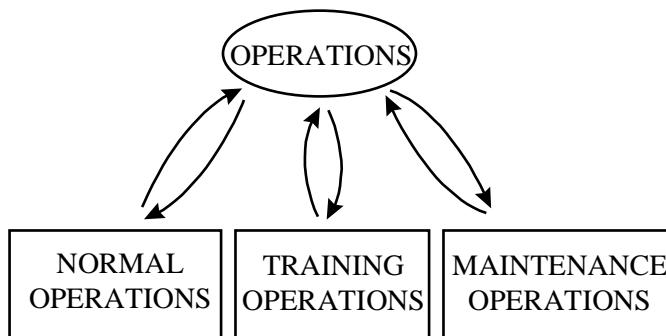


Figure 3. 1.2-1 TCS Operations State and Associated Modes Diagram

The Operations State modes shall not exist concurrently. [SSS033]

The operator shall have the capability to command the system to the Shutdown State from all modes under the Operations State. [SSS035]

The TCS hardware and software shall execute periodic Fault Detection/Location (FD/L) while in the Normal Operations Mode and Training Mode, to include a periodic determination of level of interaction. [SSS036]

3.1.2.1 Normal Operations Mode

In the Normal Operations Mode the TCS shall support the following functions: [SSS037]

1. Mission Planning
2. Mission Control and Monitoring
3. Payload Product Management
4. Target Coordinate Development
5. C4I Systems Interface

Functions under the Normal Operations Mode shall operate concurrently without precluding or excluding any of the other functions, in accordance with allowable operations as determined by the appropriate levels of interaction. [SSS038]

Figure 3.1.2.1-1 shows the functions that exist under the Normal Operations Mode.

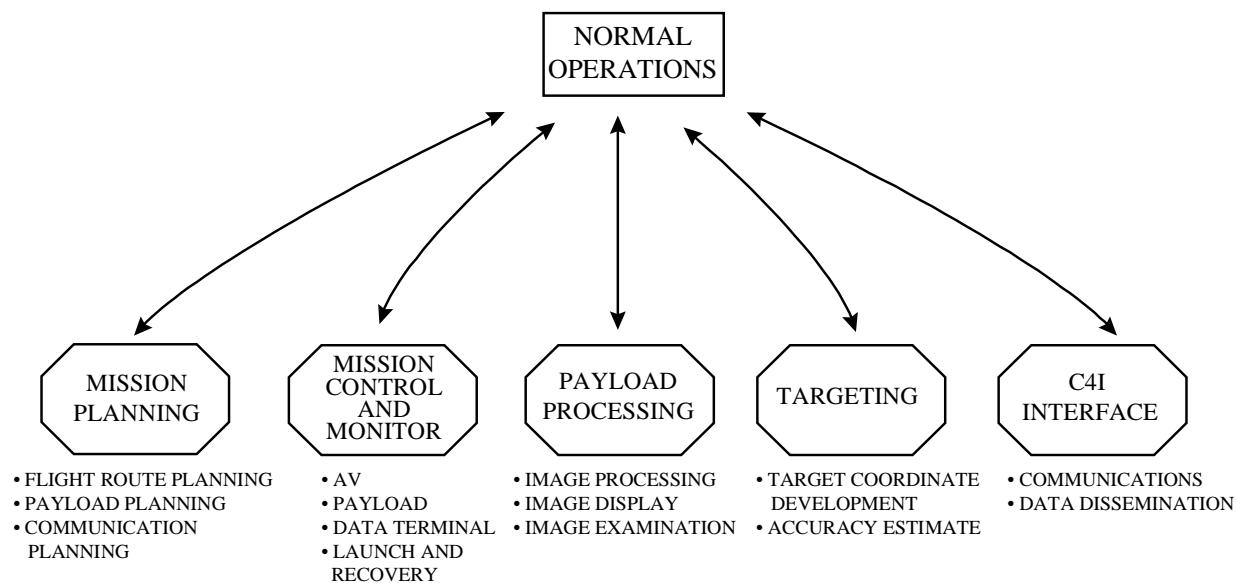


Figure 3.1.2.1-1 TCS Normal Operations and Associated Functions Diagram

3.1.2.2 Training Operations Mode

In the Training Operations Mode the TCS shall support the following functions: [SSS039]

1. Mission Planning
2. Mission Control and Monitoring

3. Payload Product Management
4. Target Coordinate Development
5. C4I Systems Interface

Functions under the Training Operations Mode shall operate concurrently without precluding or excluding any of the other functions, in accordance with allowable operations as determined by the appropriate levels of interaction. [SSS040]

Figure 3.1.2.2-1 shows the functions that exist under the Training Operations Mode.

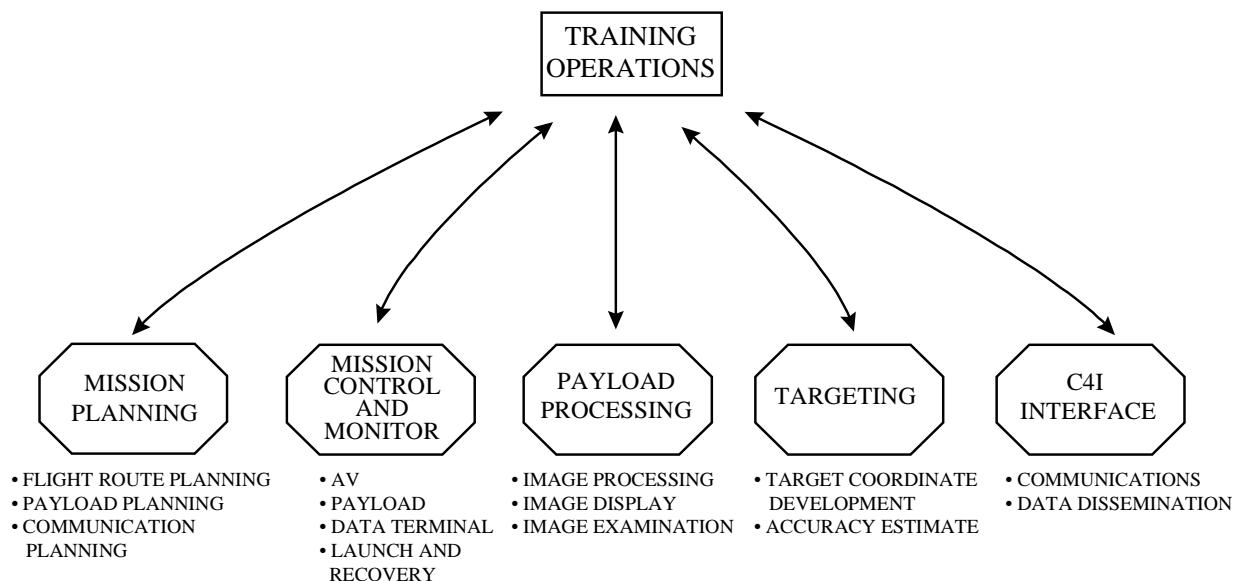


Figure 3.1.2.2-1 TCS Training Mode and Associated Functions Diagram

3.1.2.3 Maintenance Operations Mode

In the Maintenance Operations Mode the TCS shall support the following functions: [SSS041]

1. Conduct AV maintenance
2. Conduct payload maintenance
3. Conduct Data Link Terminal maintenance
4. Conduct workstation and peripheral equipment maintenance
5. Perform Fault Detection/Location (FD/L)
6. Perform Software Upgrades
7. Perform Software Debug and Monitoring

Functions, except for software upgrade and software debug, under the Maintenance Operations Mode shall operate concurrently without precluding or excluding any of the other functions in accordance with allowable operations as determined by the appropriate levels of interaction. [SSS042]

Figure 3.1.2.3-1 shows the functions that exist under the Maintenance Operations Mode.

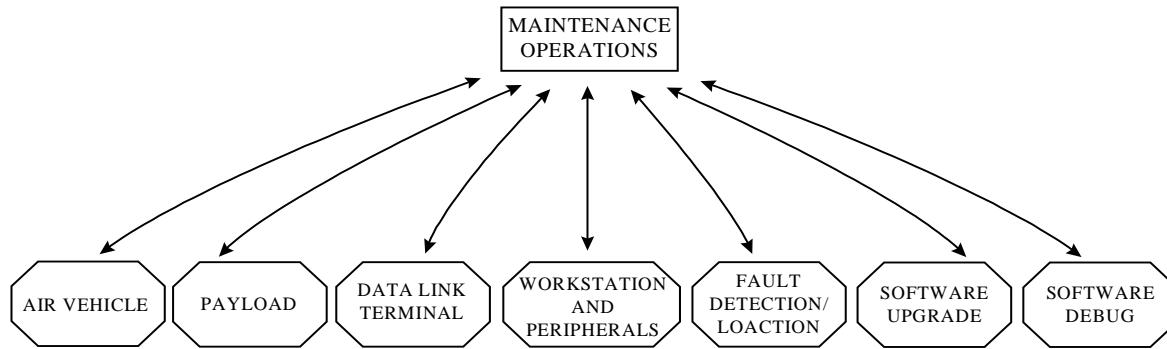


Figure 3.1.2.3-1 TCS Maintenance Mode and Associated Functions Diagram

3.1.3 Shutdown State

Upon the selection of a shutdown command the TCS shall enter the Shutdown State, which will cause the TCS to be placed in a condition where power can be removed without impacting operations as well as causing damage to the system, and from which restart of the system can be accomplished normally. [SSS043]

Shutdown of the TCS shall include storage as well as deletion, as specified by the operator, of mission data files [SSS044], shutdown of appropriate functions [SSS045], shutdown of HCIs [SSS046], and proper termination of all active interfaces [SSS047].

There shall be no modes of operation in the shutdown state. [SSS048]

3.2 System Capability Requirements

The TCS will provide the hardware and software necessary to allow the operator to conduct the following major functions 1) mission planning, 2) mission control and monitoring, 3) payload product management, 4) targeting, and 5) C4I system interface.

3.2.1 Mission Planning Function

The TCS shall have the functionality to allow the operator to generate a UAV mission plan. [SSS050]

The TCS shall have the functionality to receive and process UAV mission plans from service specific mission planning systems. [SSS053]

The TCS Mission plan shall include all necessary information required to be interoperable with the service specific mission planning systems including the Tactical Automated Mission Planning System (TAMPS), Aviation Mission Planning System (AMPS), and Air Force Mission Support System (AFMSS). [SSS051]

The TCS shall have the functionality to transmit UAV mission plans to service specific mission planning systems. [SSS055]

The TCS shall facilitate automated processing of mission plan data received via C4I interfaces in order to extract the appropriate mission planning data. [SSS052]

The TCS shall have the functionality to receive and process UAV mission plans from other TCSs. [SSS054]

The TCS shall have the functionality to transmit UAV mission plans to other TCSs. [SSS056]

A Mission Plan shall include a Flight Route Plan for a selected AV, a Payload Plan for the selected payload, and a Communications Plan. [SSS057] A Flight Route Plan is defined in Section 3.2.1.1. A Communications Plan is Defined in Section 3.2.1.3. A Payload Plan is defined in section 3.2.1.2.

The TCS shall be capable of storing a minimum of 500 mission plans under unique names to allow for later retrieval. [SSS058]

The TCS mission planning function shall provide a graphical user interface that gives the operator the ability to define waypoints on a map based display using a pointing device with full keyset redundancy. [SSS059]

The TCS shall provide the capability to compute the range and bearing between two geographic postions on the map display. [SSS561].

The TCS shall have the capability to import as well as create and modify map display overlays for fire support coordination measures [SSS547], airspace control measures [SSS548], and threat identification measures. [SSS060]

Upon completion of radar cross section analysis and characterization by the AV manufacturers for each UAV type, TCS shall utilize a UAV signature versus threat lookup table (database) that identifies the lethality of the threat to the UAV [SSS065], and shall provide the capability of displaying aircraft signature versus threat, before and during flight. [SSS066]

The TCS shall permit dynamic mission and payload retasking during all phases of operational mission execution. [SSS067]

The TCS shall allow the operator to enter as well as review mission plan parameters, including AV flight parameters, payload control parameters, data link control parameters, AV VCR control parameters (if applicable to the selected AV), and AV loiter patterns. [SSS068]

The TCS shall provide the capability to enter system configuration characteristics in the mission plan, to include selected AV type, AV identification number, selected payload type, ground control authorization information, and required communications pre-set for data links, tactical communications, and C4I data dissemination. [SSS069]

The TCS shall provide the system functionality necessary to upload a flight route plan and payload plan (if applicable) to the AV via the selected system data link as well as direct ground connection. [SSS070]

TCS shall provide the capability for the operator to retrieve a mission plan for viewing, modification, as well as deletion at the operator's discretion [SSS071], and allow the operator to save the mission plan under a different name, for future retrieval [SSS072].

The TCS shall automatically check the validity of the intended mission plan prior to being uploaded including altitude constraints, payload constraints, data link range constraints, airspace restrictions, fuel limitations, threat constraints, data link terrain masking effects, and Loss of Link (LOL) Plan. [SSS073]

The TCS shall notify the operator of all discrepancies found during the mission plan check as well as indicate successful completion of the mission plan check. [SSS074]

The TCS shall provide the capability to override validation faults after the fault is acknowledged by the operator. [SSS540]

The TCS shall allow the operator to set the LOL delay timer(s) during mission planning. [SSS075] The LOL delay is the time from when the AV detects an unplanned LOL to the time it initiates LOL procedures.

The TCS shall provide the capability to print waypoint data in alphanumeric format. [SSS553]

3.2.1.1 Flight Route Planning Capability

The Flight Route Plan, as a minimum, shall include AV flight path information, Loss of Link plan, AV VCR control tasking (if applicable to the selected AV), and data link control information. [SSS079]

The TCS shall allow the operator to define the desired AV route in waypoint format [SSS551], and shall provide the capability to include up to 500 waypoints in each flight route plan. [SSS080]

The TCS shall provide the capability to display mission waypoints and flight path graphically. [SSS081]

The TCS shall provide the capability to enter waypoint data in alphanumeric format. [SSS082]

The TCS flight route planner shall include, as a minimum, the following flight planning tools:

1. Weight and balance take off data calculations. [SSS083]
2. Fuel Calculations. [SSS084]
3. Terrain avoidance warning for line of sight flights. [SSS085]
4. Minimum data link reception altitude calculations for line of sight flights. [SSS554]

5. Payload search area information such as: visual acuity range due to atmospheric conditions, diurnal transition periods for thermal imagery, and lunar and solar terrain shadowing. [SSS086]
6. Ability to designate flight corridors and restricted air space. [SSS087]

The TCS shall present to the operator the estimated time of arrival and fuel status at each programmed waypoint of the proposed mission plan. [SSS088]

At every wayponint and every TBD minutes, the TCS shall compute the AV's flight range based on remaining fuel. [SSS076]

The TCS shall analyze the flight route plan selected for uplink to determine that the flight constraints of the AV and the limitation of the data link are not violated prior to transmission of the flight route plan to the AV. [SSS089]

The algorithmic accuracy of all flight planning calculations shall not deviate by more than 10% when compared with a mission flown by a validated 6 degree-of-freedom air vehicle simulator. [SSS090]

The flight route plan, as a minimum, shall provide the necessary AV commands to autonomously execute a programmed flight and return to a designated recovery area. [SSS091]

The TCS shall provide the operator with an interactive graphics and map based flight route planning capability. [SSS092]

The TCS shall provide the capability to create waypoints that define the desired flight path, define AV Altitude and Airspeed associated with the waypoint. [SSS093]

3.2.1.1 Map Display Task

The TCS shall provide the capability of displaying overlays each containing 100 simultaneous icons of known fire support coordination zones [SSS549], airspace control zones [SSS550], threat systems [SSS061], and displaying the threat engagement envelopes with associated radar terrain masking for those threats [SSS062].

A de-clutter capability shall be provided that allows the operator to display only a selected number of the most significant threats. [SSS063]

The TCS shall provide the capability to modify the maximum number of threats displayed, when de-clutter is selected. [SSS064]

The TCS shall provide the capability to display waypoint data in alphanumeric format. [SSS552]

The TCS shall have the capability to load a map onto the display, to zoom in and out, to scroll, to print, and to clear a map on the map display. [SSS095]

The TCS shall provide the operator with a clearly indicated map scale. [SSS535]

Upon operator request, the following icons shall be displayed on the map display (when the coordinates reside on the displayed portion of the map).

1. Display an icon indicating AV position when receiving downlink from the desired AV. [SSS096]
2. Display an icon indicating payload center field of view and footprint when receiving downlink from the desired AV. [SSS097]
3. Display an icon, in variable sizes, indicating target position and type at coordinates selected by the operator. [SSS098]
4. Display icons indicating TCS position and Ground Data Terminal (GDT) position. [SSS099]
5. Display an icon indicating Launch, Handover, and Recovery site (when applicable). [SSS100]
6. Display icons indicating Flight Plan waypoints. [SSS101]

The TCS shall be capable of displaying the positions of the icons in Lat./Lon., Universal Transverse Mercator (UTM), and Military Grid Reference System (MGRS) formats and provide conversion to multiple spheroid scales. [SSS102]

The TCS shall provide the capability to graphically display Line of Sight versus terrain profile (DTED). [SSS538]

3.2.1.2 Payload Planning Capability

For those payloads identified in Table 3-2, the TCS shall be able to generate payload planning information to be uplinked to the AV separate from a flight route plan. [SSS103]

The TCS shall provide the system functionality necessary to generate a payload plan that, as a minimum, shall include the following information: [SSS104]

1. Payload type
2. Payload commands
3. Payload mode settings
4. Payload pointing commands, manual as well as automated
5. Payload field of view settings, manual as well as automated

The TCS shall provide the capability to display the payload swath for the selected payload for planning purposes. [SSS541]

3.2.1.3 Communications Planning Capability

The TCS shall have the capability to generate a Communications Plan as part of a UAV Mission Plan [SSS105], and receive a communications plan as part of a UAV Mission Plan from a service specific mission planning system as well as another TCS [SSS106].

A Communications Plan shall include the information which defines the C4I connectivity, as well as the RF Coordination Plan. [SSS107]

3.2.2 Mission Control And Monitoring Functions

The TCS will have the capability to control and monitor an AV, payload, data link, and C4I interfaces during the execution of a mission.

While simultaneously flying two AVs of different types, the TCS shall contain and utilize the control functionality of each AV, and the monitoring capabilities of each of the AVs shall be initiated at an alternating rate of TBD seconds/minutes to perform error analysis and issue warnings when appropriate. [SSS108]

AV specific components used to perform ground based closed loop command and control functions for TCS shall be initialized upon operator selection of a specific AV. [SSS109]

The TCS shall transmit command and control information to the AV via the uplink to the AV [SSS110], and receive AV telemetry and payload information via downlink from the AV [SSS111].

3.2.2.1 AV Control And Monitoring Capability

The TCS shall be capable of being interoperable with Predator and Outrider UAVs across the 5 levels of UAV interaction. [SSS011]

The TCS shall have the capability to sequentially control and monitor multiple AVs. [SSS112]

TCS shall notify the operator when AV performance parameters are out of limits. [SSS113]

The TCS shall provide the capability to pass control of an AV to another TCS as well as an AV specific GCS [SSS114], and take control of an AV from another TCS as well as an AV specific GCS [SSS115].

The TCS shall provide the capability to control the AV flight commands as well as to release the AV to an autonomous flight control mode. [SSS118]

AV telemetry data shall be available to support other TCS functions as required. [SSS119]

The TCS shall provide the capability to control the flight of the selected AV in accordance with the specific AV's operational performance capabilities. [SSS120]

The TCS shall provide the capability to fully control and display the AV's Identification Friend or Foe (IFF). [SSS121]

The TCS shall provide the capability to enter AV preset limits which, as a minimum, will include airspeed limits, altitude limits, and fuel limits. [SSS122]

3.2.2.1.1 AV Flight Control Task

The TCS shall allow the operator to control an AV using the LOS as well as SATCOM data links. [SSS124]

The TCS shall provide the necessary system capabilities required for air vehicle flight control beyond line of sight via uplink command to two air vehicles of the same type using sequential communication techniques. [SSS125] Sequential communication means alternatively communicating with one air vehicle and then the other. Current air vehicle design does not permit concurrent communications with two air vehicles at the same time.

The TCS shall only support operation of the AV via all auto-pilot flight modes, and shall not provide the operator the capability to directly manipulate AV flight surfaces. [SSS126]

The TCS shall provide the capability to implement an emergency action plan, if supported by the AV, to control the AV during equipment failures. [SSS539]

The TCS shall provide interactive displays necessary to command the flight of an AV. [SSS127]

3.2.2.1.1.1 Flight Behavior Characteristics

The TCS shall allow the operator to command the flight behavior characteristics inherent to the selected AV. [SSS128] Table 3.2.2.1.1.1-1 shows the expected flight behavior characteristics for known and future UAVs.

Table 3.2.2.1.1.1-1 UAV Flight Behavior Characteristics

FLIGHT BEHAVIOR CHARACTERISTICS	UAV
Heading	Predator
Airspeed	
Altitude	
Time on Station	
Heading	Outrider
Airspeed	
Altitude	
Time on Station	
	Future

The operator shall have the capability to initiate as well as change, to include as a minimum manual override, flight behaviors by sending the proper control commands to the UAV. [SSS129]

3.2.2.1.2 AV Navigation Control Task

The TCS shall have the capability to command the AV to use the navigation methods inherent to the selected AV. [SSS130] Table 3.2.2.1.2-1 shows the expected navigation methods for known and future UAVs.

Table 3.2.2.1.2-1 UAV Navigation Methods

NAVIGATION METHOD	UAV
Inertial Navigation System (INS)	Predator
Global Positioning System (GPS)	Predator
GPS	Outrider
Integrated INS/GPS	Future

The operator shall have the capability to initiate as well as change, to include as a minimum manual override, UAV navigation methods by sending the proper control commands to the UAV. [SSS131]

3.2.2.1.3 ADT Control Task

The TCS shall provide the functionality to control, monitor, and display the operation of the Air Data Terminal (ADT). [SSS132] This control will include control of the ADT antenna and of the ADT transmitter and receiver.

3.2.2.1.3.1 ADT Antenna Control

The TCS shall provide the functionality to control the ADT antenna. [SSS133] This control will include its pointing direction and mode of transmission (e.g. omni and directional).

3.2.2.1.3.2 ADT Transmitter And Receiver Control

The TCS shall provide the functionality to control the power, transmitter signal strength, and frequencies used by ADT for data link communication. [SSS134]

3.2.2.1.4 AV Launch/Recovery Task

The TCS shall support an automatic launch and recovery system. [SSS135]

The TCS shall be interoperable with the Integrity Beacon Landing System (IBLS) [SSS136], and the Common Automated Recovery System (CARS) [SSS137], both used by Outrider.

The TCS shall present sufficient cues to the operator to implement and monitor automatic launch and recovery, and to initiate abort procedures if required. [SSS138]

3.2.2.1.4.1 Emergency Recovery

The TCS shall allow the operator to initiate the emergency recovery feature of the AV, if the AV has an emergency recovery feature. [SSS139]

3.2.2.1.5 AV Monitoring Task

TCS shall provide the capability to monitor specific telemetry elements real-time, and record all telemetry elements for future review and processing. [SSS140]

TCS shall provide the capability to monitor AV adherence to the uplinked mission plan, detecting any deviations greater than 10% from projected flight path, and notifying the operator if deviations are detected. [SSS141]

TCS shall provide the capability to monitor the status of all AV subsystems reporting status. [SSS142]

3.2.2.1.5.1 AV Monitoring Displays

The TCS shall display the AV status, to include but not be limited to the AV location and flight and avionics system status. [SSS143]

When the data link is interrupted, the TCS shall present the last known AV status values and the time at which the last values were reported. [SSS144]

The TCS shall be capable of displaying fuel parameters to the operator to include as a minimum, remaining fuel, flow rate, and bingo fuel. [SSS145] Bingo fuel is the minimum amount of fuel necessary to return to the designated Recovery site with reserve fuel.

The TCS shall compute the estimated position of the AV during Loss of Link (LOL) based upon the last known AV position and anticipated flight path based on current flight mode (e.g. flight route plan mode, emergency flight route plan mode, maintain current heading mode). [SSS146]

TCS shall display a LOL timer to the operator initiating a LOL onset. [SSS536]

3.2.2.2 Payload Control And Monitoring Capability

The TCS shall be capable of being interoperable with the installed payloads across the 5 levels of UAV interaction. [SSS012]

The TCS will have the capability to control and monitor the AV payload(s). [SSS147]

The TCS shall have the capability to receive data from and control payloads on an AV that is being controlled from another TCS. [SSS148]

The TCS shall provide the necessary system capabilities required for payload control beyond line of sight via uplink command of two air vehicles of the same type using sequential communication techniques. [SSS149] Sequential communication means alternatively communicating with one air vehicle and then the other. Current air vehicle design does not permit concurrent communications with two air vehicles at the same time.

The TCS shall receive, process, and present payload data to the operator so that the status of the payload can be determined. [SSS151]

3.2.2.2.1 Payload Control Task

The TCS shall permit the operator to control the payload using all methods supported by the payload installed in the selected AV. [SSS152] Table 3.2.2.2.1-1 defines the payload control methods to be supported for the candidate AVs.

Table 3.2.2.2.1-1 Payload Control Methods

PAYLOAD TYPE	CONTROL METHOD
EO/IR	Point to Coordinate
EO/IR	Hold on Coordinates
EO/IR	Auto-Track
EO/IR	Auto-Search
SAR	
Future	

The TCS shall provide a graphical user interface display for the purpose of controlling the payload. [SSS153]

The TCS shall provide override of payload automated as well as preprogrammed inputs. [SSS154]

3.2.2.2.2 Payload Monitoring Task

TCS shall provide the capability to monitor payload adherence to the uplinked mission plan. [SSS155]

3.2.2.2.2.1 Payload Monitoring Displays

The TCS shall display the current search footprint and the search history of the payload on the map. [SSS157]

3.2.2.3 Data Terminal Control And Monitoring Capability

The TCS shall have the capability to control and monitor a line-of-sight as well as satellite data terminal. [SSS158]

The TCS shall provide the system functionality necessary to record data obtained via the data link. [SSS527]

3.2.2.3.1 Data Terminal Control Task

The TCS shall be capable of interfacing with the specified data terminal and issuing data link terminal commands required to establish, control, and maintain the data link with a selected AV. [SSS159]

Data terminal control shall include, but is not limited to, antenna pointing control, transmitter control, and receiver control. [SSS160]

The TCS shall be capable of automatically selecting the proper mode of operation for the selected data terminal. [SSS161]

As a minimum the TCS LOS data terminal control modes shall include acquisition, autotrack, search, manual point, omni directional, as well as directional modes of operation, if applicable to the selected data link. [SSS162]

The operator shall be able to manually override any automatic data terminal control mode selection if desired, except during Emission Control (EMCON) and Hazards of Electromagnetic Radiation to Ordnance (HERO) conditions. [SSS163]

The TCS shall support a LOS data link and SATCOM data link capability. [SSS164]

For shipboard operations, the TCS shall provide the capability to switch to a second LOS antenna, if a second antenna is available, when desired (e.g. the currently active antenna is masked by shipboard obstructions). [SSS116]

The TCS shall provide the capability to switch to a SATellite COMMunication (SATCOM) antenna, if the selected AV has SATCOM capability, when desire (e.g. the AV proceeds beyond LOS range as well as when LOS is obstructed). [SSS117]

The TCS shall provide an interactive display for the purpose of controlling the data link terminal. [SSS165]

3.2.2.3.1.1 Antenna And Pedestal Control

The TCS shall provide automatic pointing commands for directional antennas [SSS167], and shall allow for the manual pointing of directional antennas when desired by the operator [SSS168].

The TCS shall be capable of positioning antennas to maintain LOS as well as SATCOM. [SSS170]

The TCS shall incorporate antenna pedestal 3 -axis stabilization to compensate for platform (e.g. ship, or HMMWV) motion, if applicable. [SSS557]

3.2.2.3.1.2 Transmitter And Receiver Control

The TCS shall be capable of automatically controlling the transmitter and receiver functions of the selected data terminal. [SSS171]

The operator shall be able to manually override the automatic function selection of the selected data terminal, if desired. [SSS172]

The TCS shall be capable of automatically controlling the transmitter and receiver modes of the selected data terminal. [SSS173]

The operator shall be able to manually override the automatic mode selection of the selected data terminal, if desired. [SSS174]

The TCS shall be capable of automatically controlling the transmitter and receiver frequencies of the selected data terminal. [SSS175]

The operator shall be able to manually override the automatic frequency selection if desired. [SSS176]

3.2.2.3.2 Data Terminal Monitoring Task

The TCS shall receive, process, and present status data to the operator so that the status of the data terminal and the supported AV data link can be monitored. [SSS177]

The TCS shall be capable of monitoring and displaying the signal strength of the received and transmitted signals for the selected data terminal. [SSS178]

The TCS shall be capable of monitoring and displaying the signal quality of the received and transmitted signals for the selected data terminal. [SSS179]

The TCS shall be capable of presenting to the operator a visual depiction of the minimum and maximum data link operational ranges. [SSS180]

3.2.3 Payload Product Management Function

The TCS will have the functionality necessary to manage all aspects of payload product handling to include receiving, processing, displaying, and performing limited exploitation. The payload product includes the payload sensor output and the appropriate AV and payload telemetry data.

3.2.3.1 Payload Product Processing Capability

The TCS shall have the functionality to process payload product data from Electro Optical (EO), Infrared (IR), and Synthetic Aperture Radar (SAR) payloads. [SSS182] This functionality, as a minimum, shall include: correlating, formatting, storing, internally routing, and recording the video [SSS190]; creating

and storing a freeze frame of the video [SSS191]; retrieving and displaying the video [SSS192]; printing a hard copy of freeze frame video [SSS193]; and processing digital imagery for export and dissemination [SSS194]. Payload data includes the digital and analog imagery and associated telemetry sent to the TCS from each of these payloads.

The TCS shall be able to store up to 24 hours of payload data. [SSS184] External storage can be utilized for this purpose.

The TCS shall be in compliance with Common Imagery Ground Surface Station (CIGSS), United States Imagery Standards (USIS), Video Working Group Standards Architecture, National Imagery Transmission Format (NITF) Version 2.0, and Global Command Control Systems (GCCS) when processing payload imagery data. [SSS185]

The NITF 2.0 imagery files generated by the TCS shall contain the necessary telemetry and support data to permit subsequent imagery exploitation by C4I systems. [SSS186]

The TCS shall have a built-in text entry capability including the ability to annotate textual information on imagery. [SSS187]

The TCS shall be capable of receiving HAE UAV payload imagery. [SSS188]

Payload telemetry data shall be available to support other TCS functions as required. [SSS189]

3.2.3.2 Payload Product Display Capability

The TCS shall display live and recorded imagery data, with as well as without annotation and overlay, upon operator request. [SSS195] Annotation includes operator generated comments as well as graphics which are superimposed on the imagery. Overlays consist of information obtained from external sources that is selected by the operator for presentation with the imagery.

The TCS shall provide the capability to simultaneously view imagery as well as data from more than one payload, when applicable. [SSS537]

The TCS operator shall be able to select the content of the overlay information. [SSS196]

The TCS shall have the capability to select and deselect several types of cross hairs (or other similar ICON) to identify a selected point on a target. [SSS197]

RS170A video and digital imagery shall be routed to TCS functions and displayed upon operator request. [SSS198]

3.2.3.3 Payload Product Exploitation Capability

The TCS shall have the functionality to conduct limited exploitation, to include voice and textual reporting for spot and mission objectives, on the payload product data. [SSS200] Limited exploitation, as a minimum, will include image enhancement, annotation, and graphic overlay.

The image enhancement capability shall include contrast, brightness, edge enhancement, and sharpness. [SSS201]

The TCS shall provide the capability to capture frozen-frames of imagery and store these frozen images for further review and processing. [SSS202]

The TCS shall have the capability to display Near-Real Time (NRT) imagery with overlays to include, as a minimum, date/time group, target location coordinates when the target is in the center of the field of view, north seeking arrow, and AV position and heading. [SSS203]

The TCS shall provide the capability to compute the range and bearing between two geographic positions located on the payload imagery display. [SSS560]

3.2.4 Targeting Function

The TCS will have the functionality to determine target coordinates, and estimate target coordinate accuracy.

The TCS shall support a target location function where the operator can request the current ground location of the payload field-of-view center. [SSS206]

3.2.4.1 Target Coordinate Development Capability

The TCS shall have the functionality to determine the location of items of interest within the payload field of view, and express these locations in coordinates acceptable for military applications. [SSS207]

3.2.4.2 Target Accuracy Estimation Capability

The TCS shall have the functionality to develop an estimate of the error in computed target coordinates, and associate the error estimate with the appropriate target. [SSS208]

3.2.5 C4I System Interface Function

The TCS shall be capable of entering DII-COE compliant (C4I) networks. [SSS209] Network interoperability will include, but not be limited to:

1. Radio data burst connectivity to Automatic Target Hand-off Systems (ATHS)
2. Advanced Field Artillery Tactical Data Systems (AFATDS)
3. Army Deep Operations Coordination System (ADOCS)
4. Wire connectivity to the All Source Analysis System (ASAS)
5. The Intelligence Analysis System (IAS)
6. The Joint Standoff Target Attack Radar System (JSTARS) Ground Station Module/Common Ground Station (GSM/CGS)
7. The Joint Maritime command Information System (JMCIS)

8. Closed Circuit Television (CCTV)
 9. Advanced Tomahawk Weapons Control Station (ATWCS)
 10. Joint Deployable Intelligence Support System (JDISS)
 11. Trojan Special Purpose Integrated Remote Intelligence Terminal (SPIRIT) II
 12. Joint Service Imagery Processing System (JSIPS)
 13. JSIPS Tactical Exploitation Group (JSIPS TEG)
 14. Tactical Exploitation System (TES)
 15. Service Mission Planners
 16. The Theater Battle Management Core System (TBMCS)
-
17. The Guardrail Common Sensor Aerial Common Sensor (ACS) Integrated Processing Facility (IPF)
 18. Modernized Imagery Exploitation System (MIES)
 19. Enhanced Tactical Radar Correlator (ETRAC)
 20. Contingency Airborne Reconnaissance System (CARS)
 21. Common Operational Modeling, Planning, and Simulation System (COMPASS)

The TCS shall have the functionality necessary to manage all aspects of C4I system interfaces to include receiving, processing, and transmitting tactical information to include but not limited to character based text messages, NITF 2.0 imagery files, and RS-170A video. [SSS210]

The TCS shall provide the functionality necessary to interface with various C4I systems in order to satisfy the operational requirements for: [SSS211]

1. Tasking TCS to plan and conduct a mission.
2. Presentation of payload product and target coordinates for export and dissemination.
3. Use of UAV obtained data (Non-real time tracks, tactical points and amplifying information) to provide a C4I system with information that may be used by C4I system operators, for transmission on tactical data communication links, and available to support engagement by appropriate weapons systems.

The TCS shall have the capability to interoperate with a data server to receive, extract, and push intelligence data. [SSS212]

The TCS shall have the capability to use cable to deliver live video imagery in multiple locations. [SSS213]

The TCS shall have the ability to interface with Service specific ground and airborne Ultra High Frequency (UHF), Very High Frequency (VHF), UHF/VHF, and High Frequency (HF) radios for digital message transmission while using the same radios for record traffic. [SSS214] Record traffic is defined as operational/voice communications.

Where applicable, TCS data burst messages shall comply with Variable Message Formats. [SSS215]

The TCS shall export and disseminate formatted NITF 2.0 files [SSS558], digital imagery (if applicable) [SSS218], RS-170A video (with as well as without overlay) [SSS219], and tactical communication messages [SSS220].

3.2.5.1 C4I Interface Control Capability

The TCS will have the capability to manage all operational C4I interfaces across all 5 levels of interaction.

3.2.5.1.1 C4I Digital Interface Control Capability

The TCS shall, as a minimum, have the functionality to provide the following control capabilities:

1. Send and receive tactical communication messages. [SSS222]
2. Send and receive annotated and un-annotated digital imagery. [SSS223]
3. Establish digital communication and when completed terminate communications to the C4I systems specified in Section 3.2.5 [SSS224].
4. Establish and when completed terminate digital communication to peripheral devices. [SSS225]

3.2.5.1.2 C4I Analog Interface Control Capability

The TCS shall, as a minimum, have the functionality to provide the following control capabilities:

1. Send and receive analog imagery in RS-170A format with as well as without overlay. [SSS226]
2. Establish and when completed terminate analog communication to C4I systems specified in Section 3.2.5. [SSS227]
3. Establish and when completed terminate analog communication to peripheral devices. [SSS228]

3.2.5.2 C4I Interface Data Processing Capability

The TCS will have the functionality to process received C4I messages and to prepare C4I messages for transmission. Processing will include formatting, storing, routing, and display.

3.2.5.2.1 C4I Digital Interface Data Processing Capability

The TCS shall, as a minimum, have the functionality to provide the following digital data processing capabilities:

1. Create Tactical Communications Messages to include United States Message Text Format (USMTF), Tactical Fire (TACFIRE), Over The Horizon Gold (OTH-Gold), and Intelligence and Electronic Warfare Character Oriented Message Catalog (IEWCOMCAT) For Transmission (specific message types will be identified in the TCS to C4I IDD) [SSS230]
2. Review Incoming Tactical Communication Messages [SSS231]
3. Prepare Annotated as well as Unannotated Digital Imagery For Transmission [SSS232]
4. Review Incoming Annotated as well as Unannotated Digital Imagery [SSS233]

All digital messages received by the TCS shall be automatically checked for errors and corrected when possible. [SSS234]

All erroneous messages that cannot be corrected by TCS shall be flagged to the operator. [SSS235]

The TCS shall provide the capability to log all incoming and outgoing formatted tactical messages. [SSS236]

3.2.5.2.2 C4I Analog Interface Data Processing Capability

The TCS shall, as a minimum, have the functionality to provide the following analog data processing capabilities:

1. Prepare annotated as well as unannotated analog imagery for transmission [SSS237]
2. Receive incoming annotated as well as unannotated analog imagery [SSS238]

3.2.5.3 C4I Interface Monitoring Capability

The TCS shall have the functionality to monitor the status of all C4I interfaces, and display appropriate control information. [SSS239]

The TCS shall, as a minimum, have the functionality to provide the following data monitoring capabilities:

1. Display which C4I systems are supported and online during a mission [SSS240]
2. Monitor the status of all incoming and outgoing tactical communication messages [SSS241]
3. Review all tactical communication messages received and transmitted [SSS242]
4. View incoming and outgoing, annotated as well as unannotated analog imagery [SSS243]
5. View incoming and outgoing, annotated as well as unannotated digital imagery messages [SSS244]

3.2.6 AV Maintenance Function

TCS shall be capable of executing AV maintenance software and displaying appropriate status results. [SSS245]

3.2.7 Payload Maintenance Function

TCS shall be capable of executing payload maintenance software and displaying appropriate status results. [SSS246]

3.2.8 Data Terminal Maintenance Function

TCS shall be capable of executing data terminal maintenance software and displaying appropriate status results. [SSS247]

3.2.9 Workstation and Peripheral Equipment Maintenance Function

TCS shall be capable of executing workstation and peripheral equipment maintenance software and displaying appropriate status results. [SSS248]

3.2.10 Fault Detection/Location Function

Fault Detection/Location (FD/L) to the Line Replaceable Unit (LRU) level shall be provided to indicate the readiness status of TCS. [SSS249]

As a minimum, TCS shall provide FD/L as part of normal Startup Mode, periodically during Normal Operations and Training Modes, and extensively, if selected, as part of Maintenance Mode. [SSS250]

The TCS shall allow the operator to control and monitor the AV's FD/L [SSS251], Payload's FD/L [SSS252], and Data Link FD/L [SSS253].

3.2.10.1 Startup FD/L

Startup FD/L in the TCS shall fault detect TBD% of all mission critical failures with a false alarm rate not to exceed TBD%. [SSS254]

Startup FD/L shall isolate TBD% of all detected mission critical failures to a single LRU. [SSS255]

The remaining mission critical failures detected but not isolated by Startup FD/L shall be isolated using manual isolation procedures and technical data provided to the operator by the TCS. [SSS256]

Likewise, Startup FD/L in the TCS shall fault detect TBD% of all non-mission critical failures with a false alarm rate not to exceed TBD%. [SSS257]

Startup FD/L shall isolate TBD% of all detected non-mission critical failures to a single LRU. [SSS258]

The remaining non-mission critical failures detected but not isolated by Startup FD/L shall be isolated using manual isolation procedures and technical data provided to the operator by the TCS. [SSS259]

3.2.10.2 Periodic FD/L

Periodic FD/L in the TCS shall fault detect TBD% of all mission critical failures with a false alarm rate not to exceed TBD%. [SSS260]

Periodic FD/L shall isolate TBD% of all detected mission critical failures to a single LRU. [SSS261]

The remaining mission critical failures detected but not isolated by Periodic FD/L shall be isolated using manual isolation procedures and technical data provided to the operator by the TCS. [SSS262]

Likewise, Periodic FD/L in the TCS shall fault detect TBD% of all non-mission critical failures with a false alarm rate not to exceed TBD%. [SSS263] Periodic FD/L shall isolate TBD% of all detected non-mission critical failures to a single LRU. [SSS264]

The remaining non-mission critical failures detected but not isolated by Periodic FD/L shall be isolated using manual isolation procedures and technical data provided to the operator by the TCS. [SSS265]

Periodic FD/L shall never take longer than TBD minutes to execute [SSS266] and shall periodically execute and update in the background while the system is in the Operations state. [SSS267]

3.2.10.3 Extensive FD/L

Extensive FD/L in the TCS shall fault detect TBD% of all mission critical failures with a false alarm rate not to exceed TBD%. [SSS268]

Extensive FD/L shall isolate TBD% of all detected mission critical failures to a single LRU. [SSS269]

The remaining mission critical failures detected but not isolated by Extensive FD/L shall be isolated using manual isolation procedures and technical data provided to the operator by the TCS. [SSS270]

Likewise, Extensive FD/L in the TCS shall fault detect TBD% of all non-mission critical failures with a false alarm rate not to exceed TBD%. [SSS271]

Extensive FD/L shall isolate TBD% of all detected non-mission critical failures to a single LRU. [SSS272]

The remaining non-mission critical failures detected but not isolated by Extensive FD/L shall be isolated using manual isolation procedures and technical data provided to the operator by the TCS. [SSS273]

Extensive FD/L shall allow the operator to select specific tests as well as all tests for execution. [SSS274]

Extensive FD/L shall inform the operator of the duration of a specific test and periodically, at least once every TBD seconds, delineate the estimated time until completion. [SSS275]

3.2.11 Software Upgrade Function

The TCS shall allow authorized operators to install software upgrades via CD-ROM as well as other media storage devices. [SSS276] The TCS shall restrict operator access to this capability via password protection. [SSS277]

The TCS shall provide the capability for Authorized Operators to modify all TCS programmable parameters. [SSS278] As a minimum, the TCS shall restrict Operator access to this capability via password protection. [SSS279]

The TCS shall be capable of importing National Imagery Mapping Agency (NIMA) Digital Terrain Elevation Data (DTED), Digital Feature Analysis Data (DFAD), Arc Digitized Raster Graphic and scanned hard copy maps, via compact disk. [SSS280]

The TCS shall be capable of importing map information via operator procedure [SSS555] and shall be capable of incorporating vector format and Compressed ADRG (CADRG) maps. [SSS281]

3.2.12 Software Debug and Monitoring Function

The TCS shall allow an Authorized Operator to execute a software debug capability and view the resulting debug diagnostic information. [SSS282] As a minimum, the TCS will restrict Operator access to this capability via password protection. [SSS283]

3.3 System External Interface Requirements

The TCS will interface with external systems to conduct mission coordination and operations.

The TCS shall provide the capability to interface with equipment necessary to provide connectivity with standard DoD tactical (VHF, UHF, and UHF/VHF) radios, Mobile Subscriber Equipment, and military and commercial satellite communications equipment. [SSS285]

The TCS shall interface with external mission tasking systems (e.g., receive tasking orders, coordinate mission certification). [SSS286]

The TCS shall provide the system functionality necessary to interface with the data terminal. [SSS287]

The TCS shall provide the system functionality to allow interfacing with external systems via a local area network. [SSS288]

The TCS shall provide external interfaces to launch and recovery systems. [SSS289]

3.3.1 Interface Identification

3.3.1.1 TCS to C4I

Figure 3.3.1.1-1 illustrates the TCS to C4I interfaces.

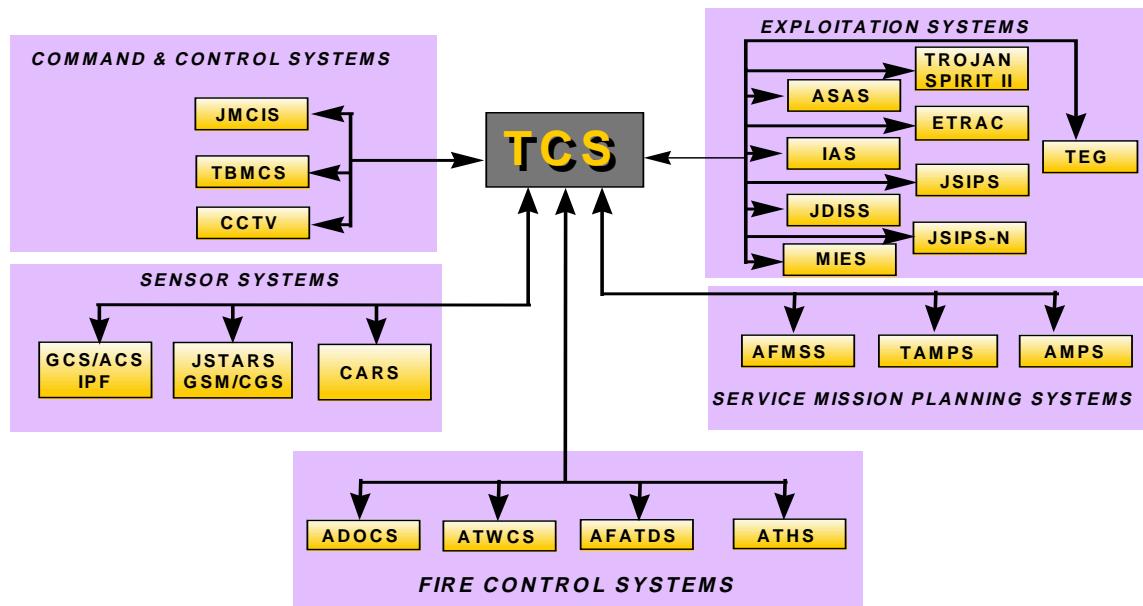


Figure 3.3.1.1-1 TCS to C4I Interface Diagram

The TCS will be interoperable with C4I systems, as listed in Section 3.2.5 of this document. Table 3.3.1.1-1 shows the implementation schedule for C4I interfaces. This prioritization schema has been validated by a Joint Requirements Oversight Council (JROC) Memorandum.

Table 3.3.1.1-1 C4I Interface Integration Priority Schedule

FY 97	FY 98	FY 99	FY 00
AFATDS	IAS	JSIPS	ATHS
ADOCS	JDISS	ACS IPF	ATWCS (I)
ASAS	TROJAN SPIRIT II	MIES	JMCIS (I)
JSTARS-CGS (C)	ETRAC	ATWCS (C)	TBCMS
CCTV	JSTARS-CGS (I)	CARS	MISSION PLANNING SYSTEMS
JSIPS-N	TEG	COMPASS	
JMCIS (C)			

(C) - Indicates interface connectivity

(I) - Indicates interface integration

For external communications to C4I systems the TCS shall utilize Tactical Communications (TACCOM) which will consist of a set of software modules accessed through an Application Programming Interface (API). [SSS290] Details of the TACCOM messages and the associated C4I system will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) - TCS Document Control Number (DCN)

3.3.1.1.1 TCS to ASAS

The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with ASAS Version TBD. [SSS291] The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.

3.3.1.1.2 TCS to JSTARS GSM

The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with JSTARS GSM Version TBD. [SSS292] The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.

3.3.1.1.3 TCS to JMCIS

The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with JMCIS Version TBD. [SSS293] The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.

3.3.1.1.4 TCS to JSIPS

The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with JSIPS Version TBD. [SSS294] The interface requirements and specifications will be defined in the Tactical Control System (TCS) TO C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.

3.3.1.1.5 TCS to AFATDS

The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with AFATDS Version TBD. [SSS295] The interface requirements and specifications will be defined in the Tactical Control System (TCS) TO C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.

3.3.1.1.6 TCS to ADOCS

The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with ADOCS Version TBD. [SSS296] The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS

Document Control Number (DCN) TBD.

3.3.1.1.7 TCS to CARS

The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with CARS Version TBD. [SSS297] The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.

3.3.1.1.8 TCS to CCTV

The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with CCTV Version TBD. [SSS298] The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.

3.3.1.1.9 TCS to Service Mission Planners

The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with Service Mission Planners. [SSS299] The interface requirements and specifications will be defined in the Tactical Control System (TCS) to Service Mission Planners Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.

3.3.1.1.10 TCS to GCS/ACS

The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with GCS/ACS Version TBD. [SSS300] The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.

3.3.1.1.11 TCS to JDISS

The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with JDISS Version TBD. [SSS301] The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.

3.3.1.1.12 TCS to TES

The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with TES Version TBD. [SSS302] The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.

3.3.1.1.13 TCS to IAS

The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with IAS Version TBD. [SSS303] The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.

3.3.1.1.14 TCS to ATHS

The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with ATHS Version TBD. [SSS304] The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.

3.3.1.1.15 TCS to ATWCS

The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with ATWCS Version TBD. [SSS305] The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.

3.3.1.1.16 TCS to TROJAN SPIRIT II

The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with Trojan Spirit II Version TBD. [SSS306] The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.

3.3.1.1.17 TCS to TBMCS

The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with TBMCS Version TBD. [SSS307] The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.

3.3.1.1.18 TCS to MIES

The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with MIES Version TBD. [SSS308] The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.

3.3.1.1.19 TCS to ETRAC

The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with ETRAC Version TBD. [SSS309] The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.

3.3.1.1.20 TCS to COMPASS

The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with COMPASS Version TBD. [SSS310] The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.

3.3.1.1.21 TCS to JSIPS TEG

The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with JSIPS TEG Version TBD. [SSS311] The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.

3.3.1.2 TCS to DT Control

Figure 3.3.1.2-1 illustrates the TCS to DT control interface.

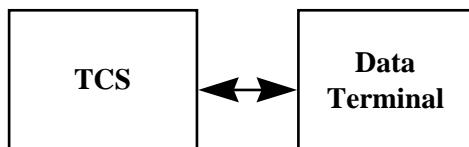


Figure 3.3.1.2-1 TCS to DT Control Interface Diagram

The TCS shall provide interfaces with the respective UAV program-provided data links for command and control and UAV data.. [SSS312]

The TCS shall have provisions for supporting both of the following external interfaces: LOS data link, SATCOM data link. [SSS313]

Details of the Tactical Control System (TCS) to DT interface will be defined in the TCS to Data Terminal Interface Design Description (IDD) Document - TCS Document Control Number (DCN).

3.3.1.3 TCS to Printer

Figure 3.3.1.4-1 illustrates the TCS to Printer interface.

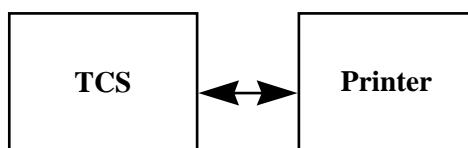


Figure 3.3.1.3-1 TCS to Printer Interface Diagram

The TCS shall provide an interface between the TCS and an external hard copy printer. [SSS314]

The TCS shall as a minimum, allow Operator(s) to print freeze-frame video, C4I Messages, Mission Plans, FD/L information, and current map display. [SSS315]

The TCS shall have the functionality to output digital message data and imagery to a hard copy printer. [SSS316]

Details of the Tactical Control System (TCS) to printer interface will be defined in the TCS to Printer Interface Design Description (IDD) Document - TCS Document Control Number (DCN).

3.3.1.4 External Data Storage Systems

Figure 3.3.1.4-1 illustrates the TCS to External Storage Device interface.

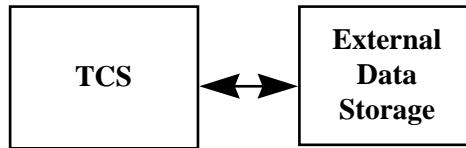


Figure 3.3.1.4-1 TCS to External Data Storage System Interface Diagram

The TCS shall provide an interface between the TCS and external data storage systems. [SSS317]

The TCS shall have the functionality to transfer digital data as well as digital imagery to and from external data storage systems. [SSS318]

Details of the Tactical Control System (TCS) to external data storage interface will be defined in the TCS to External Data Storage Interface Design Description (IDD) Document - TCS Document Control Number (DCN).

3.3.1.5 TCS to External Power

Figure 3.3.1.5-1 illustrates the TCS to External Power interface.

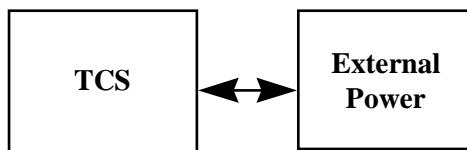


Figure 3.3.1.5-1 TCS to External Power Interface Diagram

The TCS shall have an interface between the TCS and DoD standard power supply equipment. [SSS319]

The TCS shall have the functionality to connect to the power supply equipment provided in the TCS operating environment. [SSS320]

Details of the Tactical Control System (TCS) to external power interface will be defined in the TCS to External Data Storage Interface Design Description (IDD) Document - TCS Document Control Number (DCN).

3.3.1.6 TCS to Geopositional Data

Figure 3.3.1.6-1 illustrates the TCS to geopositional data interface.

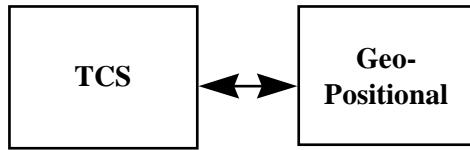


Figure 3.3.1.6-1 TCS to Geopositional Data Interface Diagram

The TCS shall have an interface to a source of current navigation information. [SSS321] As a minimum this information will include the location of all data terminals, launch and recovery sites, and the controlling TCS.

Details of the Tactical Control System (TCS) to external power interface will be defined in the TCS to Geopositional Data Interface Design Description (IDD) Document - TCS Document Control Number (DCN).

3.4 System Internal Interface Requirements

Figure 3.4-1 illustrates the TCS internal interfaces.

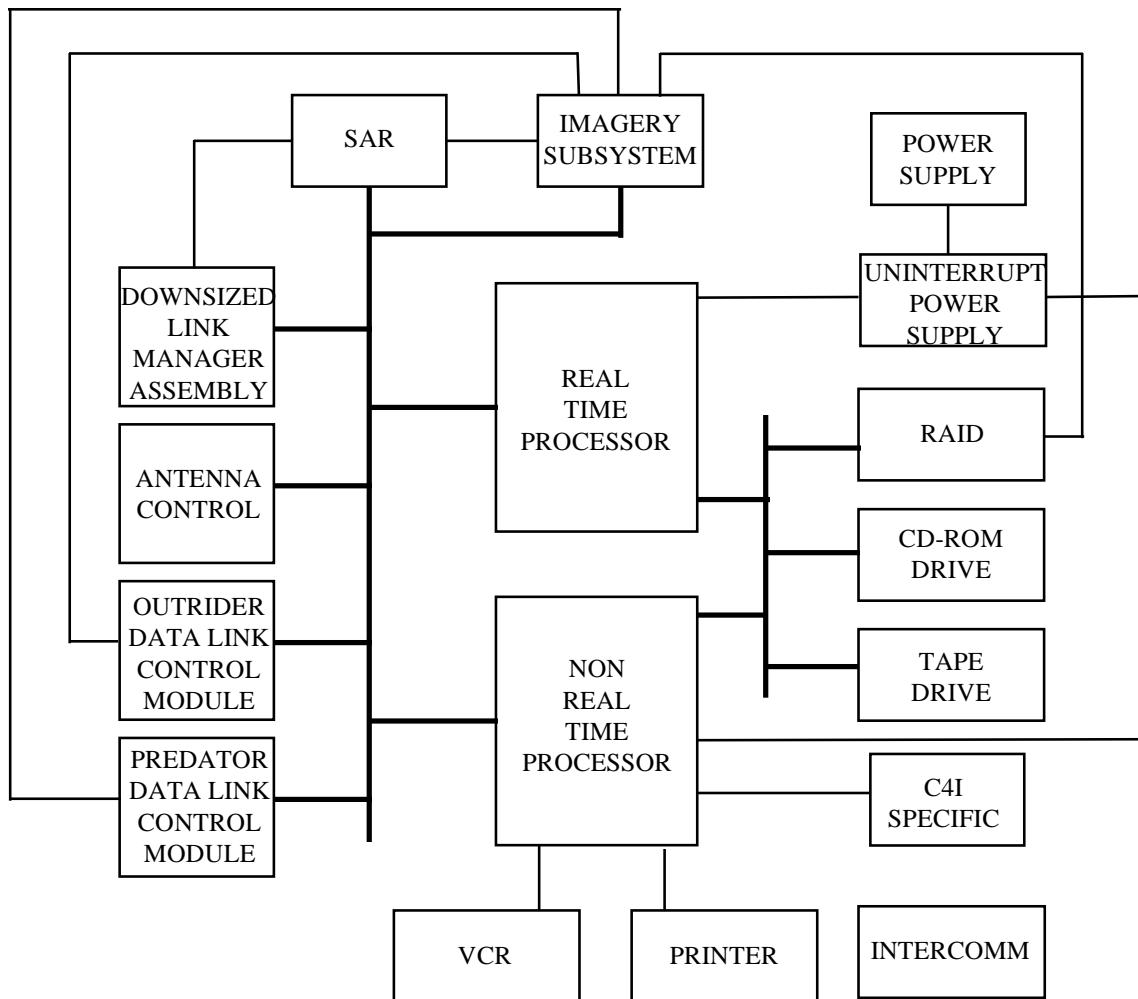


Figure 3.4-1 TCS Internal Interface Diagram

Except for the internal interfaces enumerated under this section, all TCS internal interfaces are left to the design and to the requirement specifications for system components.

The TCS will provide, as a minimum, the following internal interfaces:

1. AV Standard Interface.
2. Data Server
3. SAR Processor.
4. Intercom.
5. Local Printer.

6. Video Cassette Recorder
7. Storage devices.
8. Uninterruptible Power Supply

3.4.1 AV Standard Interface

The TCS shall implement an AV Standard Interface that will provide the proper data format to ensure communications with the selected AV. [SSS322] This interface shall allow for addition of future AVs and will provide the generic architecture to ensure interoperability. [SSS323]

The uplink and downlink information passed between the TCS and the AV shall be in accordance with the associated AV documentation. [SSS324]

The TCS shall support a concurrent uplink and downlink capability. [SSS325]

The AV Standard Interface requirements and specifications will be defined in the AV Standard Interface Design Description (IDD) Document - TCS Document Control Number (DCN).

The AV Standard Interface is designated as a mission and safety critical interface for the TCS.

3.4.2 Data Server

The TCS shall provide an internal interface for establishing communications with the data server within TCS. [SSS326]

This interface shall allow the information from the data server to be made available to other components of the TCS. [SSS327]

The Data Server interface shall support distributed processing capability. [SSS328]

The Data Server interface requirements and specifications will be defined in the Data Server Interface Design Description (IDD) Document - TCS Document Control Number (DCN)

3.4.2.1 Distributed Processing

Remotely hosted applications shall communicate in a client server relationship via the defined data server interface. [SSS329]

3.4.3 SAR Processor

The TCS shall provide an internal interface for the SAR Processor in order to disseminate SAR information (to include imagery and telemetry) to other components of the TCS. [SSS330]

The SAR Processor interface requirements and specifications will be defined in the SAR Processor Interface Design Description (IDD) Document - TCS Document Control Number (DCN).

3.4.4 Intercom

The TCS shall incorporate an intercom system that provides verbal communicate in the situation where there are multiple operators. [SSS331]

The intercom system shall be compatible with service specific voice communication systems. [SSS332]

The intercom interface requirements and specifications will be defined in the Intercom Interface Design Description (IDD) Document - TCS Document Control Number (DCN).

3.4.5 VCR

The TCS will provide an interface between the TCS and a video cassette recorder.

The TCS shall allow the Operator(s) to fully control the VCR via the TCS Display input device(s). [SSS334]

The TCS shall be able to route VCR recorded payload video to the C4I Interfaces. [SSS335]

An RS-170A video interface shall be provided for the system to output and input analog imagery and overlays to and from a Video Cassette Recorder (VCR) for recording and playback. [SSS336]

Details of the VCR interface will be defined in the VCR Interface Design Description (IDD) Document - TCS Document Control Number (DCN).

3.4.6 Printer

The TCS shall have ports for outputting data and imagery to an internal hard copy printer. [SSS337]

The TCS shall, as a minimum, allow the Operator(s) to print freeze-frame video, C4I Messages, Mission Plans, FD/L information, and current map display to an internal printer. [SSS338]

Details of the printer interface will be defined in the Printer Interface Design Description (IDD) Document - TCS Document Control Number (DCN).

3.4.7 Data Storage Devices

The TCS shall be able to access data storage devices. [SSS339]

The TCS shall have the functionality to transfer digital data as well as digital imagery to and from data storage devices. [SSS340]

3.4.7.1 CD Drive

The TCS shall provide a read and write CD drive for storage and retrieval of TCS data. [SSS341]

3.4.7.2 Tape Drive

The TCS shall provide a tape drive for storage and retrieval of TCS data. [SSS342]

3.4.7.3 Redundant Array Of Inexpensive Disks (RAID)

The TCS shall provide a RAID for storage and retrieval of TCS data. [SSS343]

3.4.8 Uninterruptible Power

The TCS shall have an interface to an uninterruptible power supply. [SSS344]

3.5 System Internal Data Requirements

All TCS internal data decisions will be left to the design and the requirement specifications for system components.

3.6 Adaptation Requirements

This section not applicable, therefore tailored out.

3.7 Safety Requirements

The TCS design shall consider all safety requirements affecting design and performance except nuclear safety. [SSS345]

The TCS safety requirements are intended to eliminate as well as control potential hazards to equipment and personnel involved in the TCS. The TCS shall comply with para 5.3 of MIL-STD 882C, "System Safety Program Requirements", dated 19 January 1993 w/ Notice 1 dated 19 January 1996. [SSS346]

3.7.1 Air Vehicle Safety

The TCS shall provide sufficient cues to allow the operator to safely take-off, land and navigate under Instrument Flight Rules. [SSS347]

The TCS shall provide adequate capability to allow the operator to operate each UAV within its certified operational flight envelope. [SSS348]

Appropriate cautions and warnings shall be provided to the operator if the air vehicle deviates into unsafe flight regime. [SSS349]

For mission planning, the TCS shall provide terrain avoidance warning and minimum reception altitude calculations for line of sight flights. [SSS350]

During mission execution, the TCS shall provide the operator a cautions and warnings when the UAV system has identified a malfunction. [SSS351]

The TCS shall provide the required information to allow the operator to maintain safe separation from other aircraft and a safe altitude in civilian airspace per Federal Aviation Administration (FAA) rules. [SSS352]

The TCS shall be designed such that no single hardware failure results in an unsafe command to be transmitted to the air vehicle. [SSS353]

The TCS shall be designed such that no single software error results in an unsafe command to be transmitted to the air vehicle. [SSS556]

The TCS shall be capable of restoring power in sufficient time to avoid loss of air vehicle control during power outages. [SSS354]

The TCS shall monitor the uplink and downlink to each UAV under its control. [SSS355]

Upon detection of loss of link, the TCS shall attempt to reestablish communications with the air vehicle. [SSS356]

3.7.2 Human Safety

The TCS design shall provide protection against injury to TCS operators and maintenance personnel. [SSS357] The system design shall use MIL-STD-2036, Section 5.1.3.11 as a guide, with regard to personnel hazards, and MIL-STD-1472D, Section 5.13, as a guide for safety from a human engineering viewpoint. [SSS358]

3.7.3 System Safety And Health Hazard Assets

System safety and health hazards, if any, shall be identified and evaluated during Phase I of the TCS development. [SSS359]

Risk levels and a program to manage the probability and severity of hazards shall also be developed. [SSS360]

3.8 Security And Privacy Requirements

The TCS is an Automated Information System (AIS). Therefore, as per DoD Regulation 5000.2-R, dated March 15, 1996, the TCS shall meet security requirements in accordance with DoD Directive 5200.28(D), “Security Requirements for Automated Information Systems” dated March 21, 1988. [SSS361]

The TCS shall be accredited by the Designated Approving Authority prior to processing classified as well as sensitive unclassified data. [SSS362]

3.8.1 Computer Security

Using risk assessment procedures defined in DoD 5200.28(D), a risk index and the minimum security

requirements for TCS shall be determined. [SSS363] The inputs to this procedure are the clearance or authorization of the TCS users and the sensitivities of the data that the TCS processes, stores or transfers. These requirements pertain to the TCS computer hardware and software.

The TCS data sensitivities shall be determined by the data sensitivities of the systems with which it interfaces, to including the air vehicles, payloads, and C4I systems. [SSS364]

3.8.2 Communications Security

Links that provide communications between the TCS and other systems shall be secured in a manner appropriate for the sensitivities of the material passed through such links, in accordance with DoD Directive C-5200.5, "Communication Security (COMSEC)" dated 21 April 1990. [SSS365]

3.8.3 Physical Security

The TCS shall be designed to protect its communication and data links against enemy Electronic Warfare (EW) threats, physical anti-radiation weaponry and physical destruction. [SSS366]

All hardware, software, documentation, and sensitive information processed by TCS shall be physically protected, minimally at the level determined by the risk index computed in Section 3.8.1, to prevent intentional as well as unintentional disclosure, destruction, and modification. [SSS367]

The TCS shall be approved for operation at the same level as the systems with which it interfaces. [SSS368]

3.8.4 Personnel Security

All TCS users, operators, maintainers and other personnel having access to TCS shall be cleared to the highest sensitivity of the data that the TCS processes, stores and transfers. [SSS369]

Additional local site procedures shall be developed to prevent the intentional or unintentional disclosure of sensitive information to unauthorized individuals. [SSS370]

A training program consisting of an initial security training and awareness briefing covering AIS security in general but also tailored to the TCS shall be developed. [SSS371]

3.8.5 Privacy Requirements

This section not applicable, therefore tailored out.

3.9 System Environment Requirements

The TCS shall be capable of operation within environments specified in the System/Subsystem Design Document for the land-based shelter and shipboard environments. [SSS372]

The TCS hardware shall be mounted as well as ruggedized to withstand inter and intra theater movement.

[SSS373]

3.10 Resource Requirements

3.10.1 Hardware Requirements

The TCS hardware will provide the functionality and capability to receive, process, and disseminate video and telemetry data from the AV and payload; perform mission planning; monitor and control the payload; monitor and control the AV; and monitor and control the data links.

The hardware of the TCS shall be capable of being scaled as well as being modular to meet the varying needs of the Services. [SSS374]

The TCS hardware shall allow for long range communications from one TCS to another [SSS375], data storage expansion [SSS376], access to other computers to share in processing capability [SSS377], and multiple external peripherals [SSS378].

The TCS hardware shall support the data rate characteristics of the AV, data link and payload to ensure interoperability. [SSS379]

For each OUTRIDER system, the TCS shall provide full independent computer redundancy. [SSS380]

The TCS shall conform with the National Institute for Standard Technology (NIST) Federal Information Processing Standard (FIPS) Publication 151-2 (POSIX.1). [SSS381]

3.10.1.1 Performance

The TCS shall have sufficient throughput to support the processing requirements of the selected data link. [SSS382]

3.10.1.2 Mass Storage

To meet growth requirements, the TCS shall be capable of adding additional storage without major hardware reconfiguration. [SSS383]

The TCS computer system shall contain a CD-ROM drive that is compatible with National Imagery and Mapping Agency (NIMA), CD-ROM Digital Terrain Elevation Data (DTED), Digital Feature Analysis Data (DFAD), and embedded training media. [SSS384]

3.10.1.3 Power

The TCS shall use standard military worldwide 110/220 volt 50/60 hertz generators and commercial power sources. [SSS385]

The TCS shall use standard electrical power sources available within the DoD family of ground mobile, airborne, and shipboard electrical power sources. [SSS386]

The TCS shall be capable of restoring power in sufficient time to avoid loss of critical mission data and loss of air vehicle control during power outages. [SSS387]

The TCS shall have an uninterrupted power supply for critical phases (landing and takeoff as a minimum) of mission execution. [SSS388]

3.10.2 Hardware Resource Utilization Requirements

The TCS throughput shall not exceed 50% of the throughput capability delivered over any 10 second period [SSS389], and as an objective throughput shall not exceed 25% of throughput capability delivered over any 10 second period. [SSS390].

The TCS shall be capable of providing a 50% spare memory storage capacity over delivered storage used [SSS391]. As an objective a 75% spare memory storage capacity over storage used shall be provided. [SSS392]

3.10.3 Computer Software Requirements

The TCS software will provide the functionality and capability to receive, process, and disseminate video and telemetry data from the AV and payload; perform mission planning; monitor and control the payload; monitor and control the AV; and monitor and control the data links.

The TCS shall have software based on Defense Information Infrastructure/Common Operating Environment per Assistant Secretary of Defense for Command, Control, Communications, and Intelligence (ASD(C3I)) Joint Technical Architecture (JTA). [SSS393]

The TCS shall comply with the Assistant Secretary of Defense (C3I) Joint Technical Architecture (JTA). This includes, but is not limited to, the language, the computer, database, architecture, and interoperability. [SSS394]

The TCS shall provide an open software architecture to be capable of supporting additional CSCIs, CSCs, and CSUs for future AVs, future payloads, and payload capabilities (e.g. auto-search and automatic target tracking), and future Tactical UAVs. [SSS395]

The TCS core software shall be generically written to provide level one through level five interaction for both Outrider and Predator UAVs and establish the architecture for future tactical UAVs. [SSS396]

The TCS software shall provide the UAV operator with the necessary tools for computer related communications, mission tasking, mission planning, mission execution, data receipt, data processing, and data dissemination. [SSS397]

The TCS software shall be capable of being hosted on a variety of computer operating systems that are organic to the various Services. [SSS398]

TCS software shall provide a windows based graphic operator interface. [SSS399]

The TCS software shall be non-proprietary and have unlimited data rights. [SSS400]

The TCS's operating system and executable software shall be re-programmable without hardware disassembly. [SSS401]

Training software shall be alterable without affecting the configuration of the operational software. [SSS402] Training software is the software that provides the computer based training functionality for the system operator.

The TCS software shall restrict the operator(s) from exercising levels of interaction not achievable by the system. [SSS403]

3.10.3.1 Display

The TCS software shall provide a high resolution, computer generated, graphical user interface that enables the UAV operator that is trained on one system to control different types of UAVs as well as UAV payloads with minimal additional training. [SSS404]

Each control console shall have, at a minimum, the capability to display the following four display windows: (1) display to provide aircraft position, TCS position, flight path, and a waypoint graphics in the foreground which are positioned in relation to a map displayed in the background, (2) display to provide aircraft flight data or payload data in the foreground, and downlinked video in the background. (3)A display to provide graphic presentations of downlinked telemetry data, and (4) display to present the interface menus for workstation software. [SSS405]

3.10.4 Computer Communication Requirements

The TACCOM segment shall provide a consistent and common set of interfaces for United States Message Text Format (USMTF), Army Tactical Command Control System (ATCSS), and Field Artillery Tactical Data Systems (FATDS) message sets. [SSS406]

The TACCOM segment shall provide external interfaces for the communications media as indicated in Table 3.10.4-1: [SSS407]

Table 3.10.4-1 Communication Media and Associated Interface Document

Communication Media	Interface Document
RS-232	IEEE RS-232
RS-422	EIA RS-422
RS-170A	ISO-XXX
Wire line, 2-wire	MIL-C-49104
Wire line, 4-wire	MIL-C-55425

Communication Media	Interface Document
MSE (DNVT, DSVT)	ICD MSE-001
MSE TPN	MSE System Specification, Appendix SR45
SINCGARS	ACCS-A3-409-001
ANG/GYC-7	ICD-016, ICD-017, TIDP for MTS
IEEE 802.3/LAN	ISO/IS 8802/2, ISO/IS 8802/3

The TACCOM segment shall provide API's for the transmission of imagery in National Imagery Transmission Formats 1.1a and 2.0 as per MILSTD-2500 and to be compatible with the Common Imagery Ground/Surface Station (CGIS) Guidelines. [SSS408]

3.11 System Quality Factors

3.11.1 Functionality

The TCS data latency shall not be greater than that present in the Predator ground control station or Outrider ground control station, whichever is smaller. [SSS409]

3.11.2 Reliability

The TCS reliability will be considered in every phase of the design and development process and shall achieve a system reliability (Mean Time Between Failures MTBF) equal to or greater than that which is specified in the Predator and Outrider ORDs. [SSS410]

3.11.3 Maintainability

The TCS maintainability will be considered in every phase of the design and development process and shall achieve a system maintainability (Mean Time To Repair MTTR) equal to or greater than that which is specified in the Predator and Outrider ORDs. [SSS411]

The Design features shall be included to: [SSS412]

1. minimize the number and frequency of required preventive maintenance actions based on performance requirements and lowest life cycle costs;

2. minimize the contribution to degradation of TCS equipment reliability as a consequence of performing either preventive as well as corrective maintenance;
3. enable the performance of all maintenance actions with safety and comparative ease by providing adequate access to all equipment components and minimizing the requirements for special tools and test equipment;
4. minimize the requirement for specially trained maintenance personnel;
5. improve system availability by the effective selection and incorporation of Built In Test Equipment (BITE);
6. allow removal and replacement of replaceable units without soldering and unsoldering.

3.11.4 Availability

The TCS equipment shall achieve an availability (A_o), as defined below, equal to or greater than that which is specified in the Predator and Outrider ORDs. [SSS413]

$$A_o = (OT + ST)/(OT + ST + TPM + TCM + TALDT)$$

where:

OT	denotes Operate Time
ST	denotes Standby Time
TPM	denotes Total Preventative Maintenance
TCM	denotes Total Corrective Maintenance
TALDT	denotes Total Administrative and Logistic Downtime

3.11.5 Flexibility

The total, fully useable, addressable, physically present program instruction memory and data storage memory for each processor shall have at least 50% unused memory during the Normal Operations Mode over any 10 second period. [SSS414]

The processing speed of each processor shall be such that at least 50% of the throughput of each processor remains unused over all 10 second periods and at least 20% of the throughput of each processor remains unused over one second periods regardless of the system function performed. [SSS415]

The I/O channel reserve capability for each processor shall have at least a 50% reserve, addressable and useable, I/O channel capacity over any 10 second period. [SSS416]

TCS software flexibility and expandability shall be provided through use of the DII COE and through use of standardized software development practices. [SSS417]

3.11.6 Portability

Hardware and software shall be selected for use in the TCS with the goal of providing ease of future changes to the TCS elements. [SSS418] The object of portability for the TCS is to select or develop hardware which will readily host emerging software packages and software which will be as independent of host hardware as possible.

The selection of processors, interface cards for communication interfaces, disk drives, video, networking equipment, and all other hardware for use in the TCS shall be made according to standards for production of an open architecture. [SSS419]

The selection of operating system and programming language for use in the TCS shall be made according to standards for development of an open architecture. [SSS420]

3.11.7 Reusability

This section not applicable, therefore tailored out.

3.11.8 Testability

Testability shall be considered in the design and development of the TCS. [SSS421]

The system shall be functionally and physically partitioned to allow for efficient fault isolation. [SSS422]

Control over internal items and devices shall be provided for detecting and isolating internal faults. [SSS423]

Test points and data paths shall be defined to support efficient fault isolation. [SSS424]

3.11.9 Usability

This section not applicable, therefore tailored out.

3.12 Design And Construction Constraints

The TCS shall provide the common software architecture for TCS interaction with Predator, Outrider, and future Tactical UAVs. [SSS425]

In the selection of hardware design solutions to satisfy the requirements herein, Non-Developmental Items (NDI) (off-the-shelf equipment previously approved for service use) shall be chosen to the maximum practicable extent. [SSS426] If NDI that provides the desired functions can not be identified, then Commercial-Off-The-Shelf (COTS) hardware may be used.

During Phase 1, design and construction will be accomplished in accordance with commercial best practices unless otherwise required to meet a specific service operational environmental factor. Design and construction requirements for Phase 2 will be revised to reflect appropriate government approved sub-tier specifications controlling all aspects of electrical and electronic or mechanical designs for new or modified TCS equipment.

3.12.1 Documentation

System documentation shall be developed as part of the TCS program and will follow MIL-STD-498 for format. [SSS427]

The documentation developed shall contain sufficient level of detail to identify the functional, operational and design requirements of the TCS. [SSS428]

The documentation shall contain sufficient technical detail to define the hardware and software design implemented to satisfy the system requirements. [SSS429]

The TCS documentation shall include: [SSS430]

- 1) The TCS System/Subsystem Specification (SSS)
- 2) The TCS System/Subsystem Design Document (SSDD)
- 3) The TCS Software Requirements Specification (SRS) (1 for each CSCI)
- 4) The Software Design Document (SDD) (1 for each CSCI)
- 5) The TCS Hardware Design Document (HDD)
- 6) Interface Design Document (IDD) for all interfaces
- 7) TCS Version Description Document(s) (VDD)

3.12.2 Materials

TCS material factors shall be governed by the NDI, GFE and COTS specifications developed by the equipment manufacturers, where applicable. [SSS431]

3.12.3 Electromagnetic Radiation

During Phase 1, control techniques to minimize electromagnetic interference, emanation, and susceptibility shall be used in the design of TCS equipment. [SSS432] This control will be inherent in the design of the TCS and the electrical and electronic equipment components and assemblies thereof.

The susceptibility to coupling and the propagation of Electromagnetic Interference (EMI) will be minimized by component location, cable routing, and judicious use of shielding.

There shall be neither unacceptable response nor malfunction of any TCS and associated equipment due to EMI produced by any as well as all of the TCS and equipment associated with the TCS. [SSS434]

The TCS shall be compatible with the external electromagnetic environment that is typical of the service specific environment in the TCS will be operated. [SSS435] The specific electromagnetic environment values will be determined during Phase I of the TCS development.

The TCS design shall ensure that personnel, fuel, and ordinance are not exposed to electromagnetic radiation as a result of operating the TCS. [SSS436] The specific radiation hazard (RADHAZ) and HERO values will be determined during Phase I of the TCS development.

As TCS transitions into Phase 2, electromagnetic radiation safety and operation specifications will be invoked in the LRIP specification.

3.12.4 Software

Newly designed software shall be developed in accordance with a tailored MIL-STD-498. [SSS437]

Software written for other systems shall be used in TCS where it is determined that the existing software is suitable for use within the TCS software. [SSS438]

A modular architecture shall be used by the TCS software in order to support future interoperability with multiple types of UAVs and payloads while maintaining consistent displays and user interfaces. [SSS439] Software components satisfying common planning and control functions will allow for vehicle specific components to be integrated in the future.

3.12.5 Hardware

TCS hardware flexibility and expansion shall be provided through use of GFE, NDI and COTS hardware designed to be upgraded and expanded. [SSS440]

3.12.6 Responsiveness

After emplacement at the operational site, the TCS shall be capable of planning and launching a mission within 1 hour of tasking. [SSS441] Required activities include 1) mission planning of a minimum 1 waypoint mission, 2) preparing 2 AVs for flight, 3) data terminal set-up, 4) safety equipment emplaced, 5) and a single AV launched.

3.12.7 Endurance

The TCS shall be capable of operating continuously in functional Operation Mode for a minimum of 72 hours. [SSS442]

3.13 Personnel-Related Requirements

3.13.1 Human Factors Engineering (HFE)

The TCS shall have ergonomically designed operator controls and displays for the 5th percentile female to 95th percentile male operator. [SSS443]

The controls shall allow the air vehicle and payload operators to perform mission control, mission monitoring, and mission updates and modifications while wearing cold weather clothing and in a Mission Oriented Protective Posture. [SSS444]

The TCS shall provide the operator a caution and warning diagnostic when the TCS system has identified a malfunction. [SSS445]

The TCS shall have monitor(s) that provide easy reading of displays under direct sunlight and low light level environments. [SSS446]

The TCS HCI shall be implemented using X-windows. [SSS447]

When performing a given task during mission execution, the operator shall be given appropriate warning messages from other concurrently-executing subsystem tasks. [SSS448]

TCS Warning messages shall be color coded and flashed based on mission criticality. The color codes and flash frequencies will follow MIL-STD 1472 guidelines. [SSS449]

The TCS operator shall be required to enter an acknowledgment prior to disabling the display of critical warning flags for any AV, Payload, ADT, GDT, and TCS faults. [SSS450]

A combination of visual and auditory outputs will be provided to alert the TCS operator to situations which may require operator response.

Visual alerts to the TCS operator shall be in the form of a displayed message box that has a display priority greater than other existing windows to ensure that it is viewable immediately by the operator. [SSS452] The position of the displayed message window shall be easily adjustable by the operator to ensure that important mission data is not obscured. [SSS453]

In addition to displayed alert messages to the TCS operator, auditory alerts to include tones shall also be provided. [SSS454] The volume of these auditory tones shall be adjustable by the operator via keyboard and trackball input to at least 20dB above the speech interference level at the operator's ear. [SSS455]

All TCS warning messages and HCI actions shall be archived for later review. [SSS456]

All TCS operator inputs shall be error checked such that any erroneous operator entry will not cause current processing to terminate. [SSS457] The HCI shall prompt the operator for a valid input. [SSS458]

Display jitter and flicker shall not be perceptible by the operator. [SSS459]

The operational tasks to be performed concurrently by the operator during normal operation will be determined by appropriate task analysis and function allocation.

The TCS shall facilitate Human-Computer Interfaces (HCIs) that support operation of all system modes, functions, and capabilities. [SSS461]

The Human Computer Interface (HCI) shall be designed and implemented in accordance with the HCI Design Approach for the UAV TCS document. [SSS462]

The HCI shall provide redundancy in all operations, so that the loss of any one HCI input device does not prohibit operation of any TCS function. [SSS463]

The TCS shall provide the functionality to display all HCI elements on any available monitor on the TCS workstation. [SSS464]

The TCS shall be capable of displaying a window within a window format to include, as a minimum,

displaying a video window overlaid on a map screen as well as a map screen overlaid on a video screen. [SSS465]

The TCS shall provide full complementary control operations from the keyset as well as the X/Y control device (e.g., trackball, mouse, joystick). [SSS466]

The TCS shall provide access to the DII Style Manager so that pointing device characteristics can be modified. [SSS467]

The TCS shall provide the functionality to have a maximum delay time of TBD from operator command to system acknowledgment and response. [SSS559]

The TCS shall provide a capability for porting an off-the-shelf, complex control joystick with at least two X/Y control devices, multiple toggle and multi-position switches as part of the TCS hardware suite. [SSS468]

The TCS shall use graphical representations to convey information, such as system status, C4I links, and AV-GDT links. [SSS469]

The TCS shall provide for multi-level information display tailoring by the operator. [SSS470]

The TCS shall provide automated TCS system information, control options, and logical & simple operator guidance and support for immediate and adaptive responding to crisis situations. [SSS471]

The TCS shall provide maximum automated system software support to system status monitoring and alerting of the TCS operator when a preset system parameter goes under as well as over a set threshold. [SSS472]

The TCS shall provide the necessary processing, display, and control capabilities to ensure dynamic situational awareness input to the TCS operator. [SSS473]

The TCS shall minimize alphanumeric data display in favor of graphic, pictorial information display [SSS474]

The TCS HCI shall provide unambiguous AV and payload control and status feedback indicators to ensure safe, efficient operations of two AVs and their payloads by a single TCS station. [SSS475]

The TCS shall provide for a specific icon shape on a constant contrast background, as well as other visual information coding mechanisms, to cue the TCS operator regarding which UAVs are under his or her primary control. [SSS476]

The TCS HCI shall provide the capability to select and amplify an object and point on a map as well as payload screen. [SSS477]

The TCS HCI shall provide coarse and fine payload control capabilities directly on the payload screen. [SSS478]

The TCS HCI shall display the SAR imaging swath on the map display. [SSS479] The TCS HCI shall

provide the on-screen capability to select and efficiently move as well as reorient a previously defined SAR imaging swath. [SSS480]

The TCS HCI shall provide the capability to lock onto and hold a coordinate point on the payload imagery window. [SSS481]

The TCS HCI shall provide the capability to display operator definable “Lock Out” zones around waypoints, Launch and Recovery Point (LRP), as well as any selected point on the AV flight path. [SSS482]

The TCS HCI shall provide for a rapid means to cancel aural warnings. [SSS484]

The TCS HCI shall provide for separation, grouping, and visual coding of multiple categories of alerts, to include Warnings, Cautions, and Advisories. [SSS485]

The TCS HCI shall provide for visual Warnings, Cautions, and Advisories to be displayed at or near the center of the field of view, i.e., within a 30° cone, of all monitors in a TCS system. [SSS486]

For AV safety as well as mission-critical Warnings, the TCS HCI shall provide a default selection as well as an override option, along with a selection of adaptive responses, and the minimum information necessary to assist the operator in responding quickly and adaptively to the emergency. [SSS487]

The TCS HCI shall provide for on-screen information to include, as a minimum, overlays, headers, cursors, alphanumeric annotation, waypoints, crosshairs, designed to be visible against the complete spectrum of map and payload video backgrounds. [SSS488]

The TCS HCI shall provide continuously-available, on-screen control functions for time and mission-critical operations, to include as a minimum print, freeze, declassification, mark VCR, declutter, cease RF transmission. [SSS489]

The TCS HCI shall provide for the capability to automatically overlay designated target locations from the payload screen onto the map screen. [SSS490]

3.14 Training Related Requirements

Formal training programs shall not be required for TCS Phase 1, Program definition and Risk Reduction. Trained and proficient personnel from the Original Equipment Manufacturers, Government Engineering Teams, supporting Contractors, and Military Personnel will support the operation and maintenance of the demonstration system equipment throughout Phase 1.

TCS training and training support shall include the processes, procedures, techniques, training devices and equipment to train civilian, active duty and reserve military personnel to operate and support the TCS system. [SSS491] This will include: individual and crew training; new equipment training; initial, formal, and on-the-job training. TCS training will strike a balance between institutional, new equipment and unit training.

The TCS system shall provide, for the operator and maintainer, an embedded or add-on interactive

training courseware with self-paced instruction, duplicating UAV flight performance characteristics, capabilities, and limitations. [SSS492] The OUTRIDER TCS system shall be compatible with the U.S. Army Intelligence and Electronic Warfare Tactical Proficiency Trainer as an objective. [SSS493]

The interactive courseware training capability for TCS shall be developed during Phase I and introduced to the user during scheduled demonstrations and tests. [SSS494]

The training capability for performance of TCS functions shall include primary mission (flight route/payload) planning, mission control and monitoring, imagery processing, tactical communications, AV control communications and TCS system on line diagnostics. [SSS495] This capability will be qualified and improved during Phase I based upon use and feedback from qualified operators and users demonstrating TCS system equipment throughout Phase I. Instructional support materials and training courseware for classroom discussion and lecture will be developed to support institutional, new equipment training and unit training.

The TCS shall provide the functional capability to train in the operation of the TCS system, performance of TCS UAV functions, and on line system troubleshooting. [SSS496]

TCS system training shall include system architecture, component familiarization, and system startup, initialization, system recovery and shutdown. [SSS497]

The TCS system shall not support formal Training operations concurrent with the execution of an actual mission. [SSS499] The capability for the conduct of actual communications processing concurrently with Training operations shall be provided if and only if messages are identified as training messages. [SSS500]

Training shall be adequate to maintain operator and maintainer skills and proficiencies. [SSS501]

TCS shall record operator and maintainer actions for self assessment and performance enhancement. [SSS502]

Operator and maintainer performance shall be measurable using parameters retrievable from the TCS to determine proficiency levels. [SSS503]

3.15 Logistics-Related Requirements

During Phase 1, TCS logistic support requirements will be based on known and predicted failure rates of components, and the criticality of those elements to the system development and flight test processes. Logistic requirements for Phase 2 will be determined and incorporated into LRIP requirements and specifications.

Support for the TCS shall be in accordance with the Integrated Logistical Support Plan (ILSP) and the maintenance concepts and policies of the individual Services. [SSS504]

All TCS Operator Manuals and Technical Manuals shall be verified and validated prior to initial operational test. [SSS529]

TCS transport and storage containers shall be reusable and enable the operators to set-up equipment within the established timelines in their ORDs. [SSS505]

The TCS shall adhere to DoD regulations and policy governing military standards for logistics, Petroleum, Oil and Lubricants (POL), Test, Measurement, and Diagnostic Equipment (TMDE), tools, and other support items. [SSS506]

Standard tools, TMDE, repair parts, and lubricants shall be used to maintain the TCS. Exceptions shall be considered on a case by case basis. [SSS507]

Each Service shall support the TCS as part of the UAV system which is organic to them. [SSS508]

The TCS shall be maintained in accordance with the UAV ORD for that Service and the level of repair analysis for the hardware chosen. [SSS509]

A TCS support and fielding package shall be developed and available for operational testing. [SSS510]

The TCS shall be maintained in accordance with Services' approved UAV maintenance concepts and procedures. [SSS511]

To the maximum extent possible, general purpose test equipment (GPTE) and common tools resident in each service shall be used to perform all corrective and preventative maintenance at all authorized levels of maintenance. [SSS512]

Tools and test equipment required to maintain the TCS but not resident in each service inventory shall be identified as special tools and special purpose test equipment (SPTE), respectively, and kept to a minimum. [SSS513]

The environmental support required by the TCS shall be the same as that required for the respective UAV System. [SSS514]

Basing for the system will follow the plan for UAV units and service command echelon requirements as delineated in the ORD. [SSS515]

3.15.1 Transportability

The TCS shall meet the deployment criteria for the organic unit to which it is assigned. [SSS516]

The TCS shall be transported into the theater as an organic component of the operational UAV system being deployed. [SSS517]

TCS transportation in theater for Army and Marine Corps systems shall be by ground, air, as well as rail transportable. [SSS518]

For the Air Force, TCS transportation to the theater shall be by air. [SSS519] Within the theater, the USAF GCS shall be capable of being moved around an established air field. [SSS520]

3.15.1.1 Ground

The TCS shall be ground transportable. [SSS521]

3.15.1.2 Air

The TCS shall be air transportable by helicopter (CH-47/CH-53D) and C-130 drive-on/drive-off capable. [SSS522]

3.15.1.3 Sea

The TCS shall be sea transportable. [SSS523]

3.15.1.4 Rail

The TCS shall be rail transportable. [SSS524]

3.15.1.5 Preparation Time

The TCS shall be configurable for sea, ground, as well as air transport in 2 hours or less. [SSS525]

The TCS system shall be capable of being de-configured from sea, ground, as well as air transport and ground-mobile in 2 hours or less. [SSS526]

3.16 Other Requirements

The TCS shall have an objective capability to be integrated and operated from tactical and command and control aircraft. [SSS531]

The TCS shall have an objective capability to be integrated and operated from submarines. [SSS532]

The TCS shall have a capability to be integrated and operated from land based platforms. [SSS533]

The TCS shall have an objective capability to be integrated and operated from ships. [SSS534]

3.17 Packaging Requirements

This section not applicable, therefore tailored out.

3.18 Precedence And Criticality Of Requirements

All requirements in this specification are of equal weight and criticality unless otherwise identified in the traceability Table in Appendix (TBD).

When the requirements of the Operational Requirement Document (ORD), this System/Subsystem Specification (SSS), other related requirement documents, and referenced documents are in conflict, the

following precedence will apply:

1. TCS ORD - The ORD shall have precedence over any other TCS documentation.
2. TCS SSS - This SSS shall have precedence over other requirements documents except item (1.) above.
3. Other TCS requirement documents - Other requirement documents shall have precedence over any referenced documents.
4. Referenced documents - Documents referenced herein and in other TCS requirement documents shall have precedence over all applicable subsidiary documents referenced therein.

In the event of conflicting requirements within a TCS requirement document, the requirements shall be traced to the next higher precedence requirement document for clarification. If further resolution is required, the developer will notify the procuring agency.

4.0 QUALITY ASSURANCE PROVISIONS

4.1 *Responsibility for Inspections.*

The Quality Assurance (QA) Program is an integral part of the development process for the TCS , whereby all phases of the development of a system must be inspected and tested, as these phases occur. The objectives and processes of the QA Program applicable to this development effort are contained in the TCS Integration Program Quality Assurance Plan, NSWCDD/TR-96/XXX.

4.2 *Special Tests and Examinations.*

Verification of requirements will be accomplished by the use of appropriate combinations of inspections, analyses, demonstrations and tests. The method to be used for verification of each requirement is identified in Appendix B. The following defines verification methods as used in this specification:

- a. Demonstration: The operation of the system, or a part of the system, that relies on observable functional operation not requiring the use of instrumentation, special test equipment, or subsequent analysis.
- b. Test: The operation of the system, or a part of the system, using instrumentation or other special test equipment to collect data for later analysis.
- c. Analysis: The processing of accumulated data obtained from other qualification methods. Examples are reduction, interpolation, or extrapolation of test results.
- d. Inspection: The visual examination of system components, documentation, etc.
- e. Special qualification methods. Any special qualification methods for the system, such as special tools, techniques, procedures, facilities, acceptance limits, use of standard samples, pre-production or periodic production samples, pilot models, or pilot lots.

4.2.1 **Government Verification.**

All QA functions performed will be monitored by the QA Team. Verification will consist of surveillance of the operation to determine that practices, methods, and procedures are being properly applied; product inspection to measure quality of products to be offered for acceptance; and product inspection of delivered products to ensure compliance with all the requirements of this specification.

4.2.2 Integrated Test Program.

The system will be tested via an integrated program conducted according to the TCS Master Test Plan, NSWCDD/TR-96/XXX. The integrated program consists of three (3) distinct categories, as defined in the Master Test Plan: data link tests, integration tests, and flight tests.

4.3 Requirements Cross-Reference.

Requirements within this document represent a tailored use of MIL-STD-498. Verification and testing, per Section 4.2, of the system for compliance with the requirements specified herein will be accomplished per the cross-reference tables in Appendix B.

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APPENDIX A: Requirements Traceability Matrix

TCS SSS TO TCS ORD REQUIREMENT CROSS-REFERENCE AND TEST METHODOLOGY MATRIX

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
3	Engineering Requirements		
SSSS001	DELETED		
SSSS002	DELETED		
SSSS003	DELETED		
SSSS004	The TCS shall consist of the TCS workstation Hardware Configuration Items (HWClIs), TCS Computer Software Configuration Items (CSClIs), and additional TCS Support HWClIs and CSClIs.	ORD014 The TCS software and hardware related hardware shall be developed so that it is scaleable to meet the users' needs.	I
SSSS005	DELETED		
SSSS006	DELETED		
SSSS007	DELETED		
SSSS008	The TCS shall meet the capability criteria, those applicable to the TCS project, established by the Predator ORD and the Outrider ORD.	ORD073 The TCS shall meet the mission capability criteria established by the MAE UAV and TUAV ORDs.	I
SSSS009	The TCS system shall provide software capabilities and hardware configurations necessary to fulfill the operational tasking requirements across the 5 levels of interaction.	ORD012 The TCS shall provide full interoperability between the Services and their UAV systems with varying levels of U/AV interaction.	D

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS010	The TCS shall support 5 levels of UAV interaction: [SSS010] Level 1: receipt and transmission of secondary imagery and/or [as well as] data Level 2: direct receipt of imagery and/or [as well as] data Level 3: control of the UAV payload in addition to direct receipt of imagery/data Level 4: control of the UAV, less launch and recovery, plus all the functions of level three Level 5: capability to have full function and control of the UAV from takeoff to landing	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D
SSS013	Table 3-2 identifies the payloads with which the TCS shall interoperate. Table 3-2 Interoperable TCS Payloads	ORD026 The TCS shall be capable of being interoperable with multiple platforms/payloads simultaneously.	D
	<i>3.1 Required States And Modes</i>		
SSS014	The states of operation of the TCS shall include Startup, Operation, and Shutdown.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	A/I
SSS015	The TCS states shall not exist concurrently.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	A/I
	<i>3.1.1 Startup State</i>		
SSS016	Upon application of power the TCS shall enter the Startup State.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/I
SSS017	The Startup State shall be comprised of the following modes: Normal Startup Mode, and Recovery Startup Mode.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	I
SSS018	DELETED	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSS019	When the TCSS Software is terminated normally the TCS shall enter the Normal Startup Mode of operation upon application of power.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS020	When the TCS software is halted due to an unplanned power interruption as well as abnormal program termination, then the TCS shall enter the Recovery Startup Mode upon application of power..	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSS021	During startup, the TCS shall determine which of the 5 levels of interaction are achievable by the TCS configuration.	ORD015 The TCS shall prevent users from entering levels of interaction for which they are not authorized by software and/or hardware configuration.	D/I
SSS022	Levels of interaction higher than those achievable by a particular TCS configuration shall be prohibited.	ORD015 The TCS shall prevent users from entering levels of interaction for which they are not authorized by software and/or hardware configuration.	D/I
SSS023	The TCS shall inform the operator if the operator attempts to execute a function prohibited as a result of the determined level of interaction.	ORD015 The TCS shall prevent users from entering levels of interaction for which they are not authorized by software and/or hardware configuration.	D
3.1.1 Normal Startup Mode			
SSS024	When executing in the Normal Startup Mode, the TCS shall provide the system functionality necessary to initialize the system to place it in the Operations State within 60 seconds from the time power is supplied and the TCS application is launched.	ORD089 The TCS hardware and software shall include FIDL during initial computer system boot-up.	D
SSSS542	Initialization of the TCS HWCLs shall include startup of HWCLs	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
SSS026	Initialization of the TCS shall include download of software.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
SSSS027	Initialization of the TCS shall include start of CSCIs.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSS025	Initialization of the TCS shall include execution of Startup FDL.	ORD089 The TCS hardware and software shall include FIDL during initial computer system boot-up.	D/I
SSS028	Initialization of the TCS shall include establishment of the state of readiness of all interfaces.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
3.1.2 Recovery Startup Mode			

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS029	The TCS in the Recovery Startup Mode shall provide the system functionality to resume the Operations State within 45 seconds.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	T/I
SSS543	Recovery of the TCS HWCI's shall include startup of HWCI's.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
SSS544	Recovery of the TCS HWCI's shall include download of software.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
SSS545	Recovery of the TCS HWCI's shall include startup of CSCIs.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSS546	Recovery of the TCS HWCI's shall include and establishment of the state of readiness of all interfaces.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSS528	The TCS shall be capable of automatically recording system state data, interface communications and other information necessary to support event reconstruction.	ORD048 The TCS shall receive, process, format, store, retrieve flight and payload data, and perform limited exploitation of payload data.	D/T/I
SSS030	For recovery from abnormal termination periods of less than a programmable time (T1), the TCS shall resume the previous Operations State in the functions and using data that was executing prior to the abnormal termination.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	T
SSS031	For recovery from abnormal termination periods of greater than time T1, TCS shall prompt the operator to select the type of recovery to be executed: (1) Resume in the Same Modes And Data; (2) Resume in the Same Modes but Review and Modify the Command Data as Necessary; or, (3) Perform a Command Shutdown and Startup Via the Normal Startup Mode.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	T
3.1.2 Operations State			
SSS032	When in the Operations State the TCS shall be capable of operating in three modes: normal operations mode, training operations mode, and maintenance operations mode.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/A/I

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS033	The Operations State modes shall not exist concurrently.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	A/I
SSS034	DELETED	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSS035	The operator shall have the capability to command the system to the Shutdown state from all modes under the Operations State.	ORD089 The TCS hardware and software shall execute periodic Fault Detection Logic (FDL) while in the Normal Operations Mode and Training Mode, to include a periodic determination of level of interaction.	T
3.1.2.1 Normal Operations Mode			
SSS037	In the Normal Operations Mode the TCS will support the following functions: 1. Mission Planning 2. Mission Control and Monitoring 3. Payload Product Management 4. Target Coordinate Development 5. C4I Systems Interface	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/I
SSS038	Functions under the Normal Operations mode shall operate concurrently without precluding or excluding any of the other functions, in accordance with allowable operations as determined by the appropriate levels of interaction.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/I
3.1.2.2 Training Operations Mode			
SSS039	In the Training Operations Mode the TCS shall support the following functions: 1. Mission Planning 2. Mission Control and Monitoring 3. Payload Product Management 4. Target Coordinate Development 5. C4I Systems Interface	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/I
SSS040	Functions under the Training Operations mode shall operate concurrently without precluding or excluding any of the other functions, in accordance with allowable operations as determined by the appropriate levels of interaction.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/I

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
	3.1.2.3 Maintenance Operations Mode		
SSSS041	In the Maintenance Operations Mode the TCS shall support the following functions: <ol style="list-style-type: none"> 1. Conduct AV maintenance 2. Conduct payload maintenance 3. Conduct Data Link Terminal maintenance 4. Conduct workstation and peripheral equipment maintenance 5. Perform Fault Detection/Location (FDL) 6. Perform Software Upgrades 	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/I
SSSS042	Perform Software Debug and Monitoring Functions, except for software upgrade and software debug, under the maintenance operations mode shall operate concurrently without precluding or excluding any of the other functions in accordance with allowable operations as determined by the appropriate levels of interaction.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/I
	3.1.3 Shutdown State		
SSSS043	Upon the selection of a shutdown command the TCS shall enter the Shutdown State, which will cause the TCS to be placed in a condition where power can be removed without impacting operations as well as causing damage to the system, and from which restart of the system can be accomplished normally.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/I
SSSS044	Shutdown of the TCS shall include shutdown of appropriate deletion, as specified by the operator, of mission data files.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	T
SSSS045	Shutdown of the TCS shall include shutdown of appropriate functions.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	T/I
SSSS046	Shutdown of the TCS shall include shutdown of HCIs.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/I

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS047	Shutdown of the TCS shall include proper termination of all active interfaces.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	T
SSS048	There shall be no modes of operation in the shutdown state.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	I/D
SSS049	<i>3.2 System Capability Requirements</i> DELETED		
	3.2.1 Mission Planning Function		
SSS050	The TCS shall have the functionality to allow the operator to generate a UAV mission plan.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/I
SSS053	The TCS shall have the functionality to receive and process UAV mission plans from service specific mission planning systems.	ORD041 The TCS shall be capable of downloading mission plans from Service-specific mission planning systems (e.g., Tactical Aircraft Mission Planning System and Air Force Mission Support System).	D/T/I
SSS051	The TCS Mission plan shall include all necessary information required to be interoperable with the service specific mission planning systems including the Tactical Automated Mission Planning System (TAMPS), Aviation Mission Planning System (AMPS), and Air Force Mission Support System (AFMSS).	ORD040 The TCS shall be capable of storing mission plans and exporting them to other TCSs and exporting them to force level mission planning systems.	I
SSS055	The TCS shall have the functionality to transmit UAV mission plans to service specific mission planning systems.	ORD040 The TCS shall be capable of storing mission plans and exporting them to other TCSs and exporting them to force level mission planning systems.	D
SSS052	The TCS shall facilitate automated processing of mission plan data received via C4I interfaces in order to extract the appropriate mission planning data.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T/I
SSS054	The TCS shall have the functionality to receive and process UAV mission plans from other TCSs.	ORD040 The TCS shall be capable of storing mission plans and exporting them to other TCSs and exporting them to force level mission planning systems.	D/T/I
SSS056	The TCS shall have the functionality to transmit UAV mission plans to other TCSs.	ORD040 The TCS shall be capable of storing mission plans and exporting them to other TCSs and exporting them to force level mission planning systems.	D

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS057	A Mission Plan shall include a Flight Route Plan for a selected AV, a Payload Plan for the selected payload, and a Communications Plan.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	I
SSS058	The TCS shall be capable of storing a minimum of 500 mission plans under unique names to allow for later retrieval.	ORD041 The TCS shall be capable of downloading mission plans from Service-specific mission planning systems (e.g., Tactical Aircraft Mission Planning System and Air Force Mission Support System).	T
SSS059	The TCS mission planning function shall provide a graphical user interface that gives the operator the ability to define waypoints on a map based display using a pointing device with full keyset redundancy.	ORD034 The TCS shall be capable of providing point-and-click route and sensor planning.	D
SSS061	The TCS shall provide the capability to compute the range and bearing between two geographic positions located on the map display.	ORD034 The TCS shall be capable of providing point-and-click route and sensor planning.	D
SSS0547	The TCS shall have the capability to import as well as create and modify map display overlays for fire support coordination measures.	ORD036 The TCS shall have tools for importing or creating overlays for fire support coordination measures, airspace control measures, and threat.	D
SSS0548	The TCS shall have the capability to import as well as create and modify map display overlays for airspace control measures.	ORD036 The TCS shall have tools for importing or creating overlays for fire support coordination measures, control measures, and threat.	D
SSS060	The TCS shall have the capability to import as well as create and modify map display overlays for threat identification measures.	ORD036 The TCS shall have tools for importing or creating overlays for fire support coordination measures, control measures, and threat.	D
SSS065	Upon completion of radar cross section analysis and characterization by the AV manufacturers for each UAV type, TCS shall utilize a UAV signature versus threat lookup table (database) that identifies the lethality of the threat to the UAV.	ORD038 The TCS shall provide the following survivability mission planning features: b. Provide a method of displaying aircraft signature versus threat, before and during flight.	D/T/A/I
SSS066	Upon completion of radar cross section analysis and characterization by the AV manufacturers for each UAV type, TCS shall provide the capability of displaying aircraft signature versus threat, before and during flight.	ORD038 The TCS shall provide the following survivability mission planning features: b. Provide a method of displaying aircraft signature versus threat, before and during flight.	D
SSS067	The TCS shall permit dynamic mission and payload retasking during all phases of operational mission execution.	ORD047 The TCS shall provide dynamic mission and sensor retasking during operational mission execution.	D
SSS068	The TCS shall allow the operator to enter as well as review mission plan parameters, including AV flight parameters, payload control parameters, data link control parameters, AV VCR control parameters (if applicable to the selected AV), and AV loiter patterns.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS069	The TCS shall provide the capability to enter system configuration characteristics in the mission plan, to include selected AV type, AV identification number, selected payload type, ground control authorization information, and required communications pre-set for data links, tactical communications, and C4I data dissemination.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSS070	The TCS shall provide the system functionality necessary to upload a flight route plan and payload plan (if applicable) to the AV via the selected system data link as well as direct ground connection.	ORD035 The TCS shall program air vehicles with mission planning data prior to launch.	D/T
SSS071	TCS shall provide the capability for the operator to retrieve a mission plan for viewing, modification, as well as deletion at the operator's discretion	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
SSS072	TCS shall provide the capability for the operator to save the mission plan under a different name, for future retrieval	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
SSS073	The TCS shall automatically check the validity of the intended mission plan prior to being uploaded including altitude constraints, payload constraints, data link range constraints, airspace restrictions, fuel limitations, threat constraints, data link terrain masking effects, and Loss of Link (LOL) Plan.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	T/I
SSS074	The TCS shall notify the operator of all discrepancies found during the mission plan check as well as indicate successful completion of the mission plan check.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSS540	The TCS shall provide the capability to override validation faults after the fault is acknowledged by the operator.		
SSS075	The TCS shall allow the operator to set the LOL delay timer(s) during mission planning.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSS553	The TCS shall provide the capability to print waypoint data in alphanumeric format.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	
SSS077	3.2.1.1 Flight Route Planning Capability DELETED		70

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS078	DELETED		
SSS079	The Flight Route Plan, as a minimum, shall include AV flight path information, payload tasking information, Loss of Link plan, AV VCR control tasking (if applicable to the selected AV), and data link control information.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/I
SSS551	The TCS shall allow the operator to define the desired AV route in waypoint format	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
SSS080	The TCS shall provide the capability to include up to 500 waypoints in each flight route plan.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
SSS081	The TCS shall provide the capability to display mission waypoints and flight path graphically.	ORD034 The TCS shall be capable of providing point-and-click route and sensor planning.	D
SSS082	The TCS shall provide the capability to enter waypoint data in alphanumeric format.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSS083	The TCS flight route planner shall include, as a minimum, the following flight planning tools: 1. Weight and balance take off data calculations.	ORD030 The TCS shall include the basic flight planning tools. As a minimum these tools will include: 1. Weight and balance take off data calculations.	D/I
SSS084	The TCS flight route planner shall include, as a minimum, the following flight planning tools: 2. Fuel Calculations	ORD031 The TCS shall include the basic flight planning tools. As a minimum these tools will include: 2. Fuel Calculations	D/I
SSS085	The TCS flight route planner shall include, as a minimum, the following flight planning tools: 3. Terrain avoidance warning for line of sight flights.	ORD032 The TCS shall include the basic flight planning tools. As a minimum these tools will include: 3. Terrain avoidance warning and minimum reception altitude calculations for line of sight flights.	D/I
SSS554	The TCS flight route planner shall include, as a minimum, the following flight planning tools: 4. Minimum data link reception altitude calculations for line of sight flights.	ORD032 The TCS shall include the basic flight planning tools. As a minimum these tools will include: 3. Terrain avoidance warning and minimum reception altitude calculations for line of sight flights.	D/I
SSS086	The TCS flight route planner shall include, as a minimum, the following flight planning tools: 5. Payload search area information such as: visual acuity range due to atmospheric conditions; diurnal transition periods for thermal imagery, and lunar and solar terrain shadowing.	ORD033 The TCS shall include the basic flight planning tools. As a minimum these tools will include: 4. Payload search area information such as: visual acuity range due to atmospheric conditions; diurnal transition periods for thermal imagery, and lunar and solar terrain shadowing.	D/I

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS087	The TCS flight route planner shall include, as a minimum, the following flight planning tools: 6. Ability to designate flight corridors and restricted air space.	ORD036 The TCS shall have tools for importing or creating overlays for fire support coordination measures, airspace control measures, and threat.	D/I
SSS088	The TCS shall present to the operator the estimated time of arrival and fuel status at each programmed waypoint of the proposed mission plan. At every waypoint and every TBD minutes, the TCS shall compute the AV's flight range based on remaining fuel.	ORD030 The TCS shall include the basic flight planning tools. As a minimum these tools will include: 1. Weight and balance take off data calculations.	D/T
SSS076		ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
SSS089	The TCS shall analyze the flight route plan selected for uplink to determine that the flight constraints of the AV and the limitation of the data link are not violated prior to transmission of the flight route plan to the AV.	ORD030 The TCS shall include the basic flight planning tools. As a minimum these tools will include: 1. Weight and balance take off data calculations.	T/I
SSS090	The algorithmic accuracy of all flight planning calculations shall not deviate by more than 10% when compared with a mission flown by a validated 6 degree-of-freedom air vehicle simulator.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T/I/A
SSS091	The flight route plan, as a minimum, shall provide the necessary AV commands to autonomously execute a programmed flight and return to a designated recovery area.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T/I
SSS092	The TCS shall provide the operator with an interactive graphics and map based flight route planning capability.	ORD034 The TCS shall be capable of providing point-and-click route and sensor planning.	D
SSS093	The TCS shall provide the capability to create waypoints that define the desired flight path, define AV Altitude and Airspeed associated with the waypoint.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
3.2.1.1 Map Display Task			
SSS094	DELETED		
SSS549	The TCS shall provide the capability of displaying overlays each containing 100 simultaneous icons of known fire support coordination zones.	ORD039 The TCS shall provide the following survivability mission planning features: c. The system should be capable of displaying overlays or icons of known threat systems and displaying the threat engagement envelopes and associated radar terrain masking for those threats for route planning.	D/T
SSS550	The TCS shall provide the capability of displaying overlays each containing 100 simultaneous icons of known airspace control zones.	ORD039 The TCS shall provide the following survivability mission planning features: c. The system should be capable of displaying overlays or icons of known threat systems and displaying the threat engagement envelopes and associated radar terrain masking for those threats for route planning.	D/T

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS061	The TCS shall provide the capability of displaying overlays each containing 100 simultaneous icons of known threat systems	ORD039 The TCS shall provide the following survivability mission planning features: c. The system should be capable of displaying overlays or icons of known threat systems and displaying the threat engagement envelopes and associated radar terrain masking for those threats for route planning.	D/T
SSS062	The TCS shall provide the capability of displaying overlays each containing 100 simultaneous icons of known threat engagement envelopes with associated radar terrain masking for those threats.	ORD039 The TCS shall provide the following survivability mission planning features: c. The system should be capable of displaying overlays or icons of known threat systems and displaying the threat engagement envelopes and associated radar terrain masking for those threats for route planning.	D
SSS063	A de-clutter capability shall be provided that allows the operator to display only a selected number of the most significant threats.	ORD043 The TCS shall be ergonomically designed and provide sufficient cues to allow the pilot to safely take off, land, and navigate under Instrument Flight Rules.	D/T
SSS064	The TCS shall provide the capability to modify the maximum number of threats displayed, when de-clutter is selected.	ORD039 The TCS shall provide the following survivability mission planning features: c. The system should be capable of displaying overlays or icons of known threat systems and displaying the threat engagement envelopes and associated radar terrain masking for those threats for route planning.	D
SSS552	The TCS shall provide the capability to display waypoint data in alphanumerical format.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture	D
SSS095	The TCS shall have the capability to load a map onto the display, to zoom in and out, to scroll, to print, and to clear a map on the map display.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSS535	The TCS shall provide the operator with a clearly indicated map scale.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture	D
SSS096	Upon operator request, the following icons shall be displayed on the map display (when the coordinates reside on the displayed portion of the map). 1. Display an icon indicating AV position when receiving downlink from the desired AV.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
SSS097	Upon operator request, the following icons shall be displayed on the map display (when the coordinates reside on the displayed portion of the map). 2. Display an icon indicating payload center field of view and footprint when receiving downlink from the desired AV.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS098	Upon operator request, the following icons shall be displayed on the map display (when the coordinates reside on the displayed portion of the map). 3. Display an icon, in variable sizes, indicating target position and type at coordinates selected by the operator.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
SSS099	Upon operator request, the following icons shall be displayed on the map display (when the coordinates reside on the displayed portion of the map). 4. Display icons indicating TCS position and Ground Data Terminal (GDT) position	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
SSS100	Upon operator request, the following icons shall be displayed on the map display (when the coordinates reside on the displayed portion of the map). 5. Display an icon indicating Launch, Handover, and Recovery site (when applicable),	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
SSS101	Upon operator request, the following icons shall be displayed on the map display (when the coordinates reside on the displayed portion of the map). 6. Display icons indicating Flight Plan waypoints.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
SSS102	The TCS shall be capable of displaying the positions of the icons in Lat./Lon., Universal Transverse Mercator (UTM), and Military Grid Reference System (MGRS) formats and provide conversion to multiple spheroid scales.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSS538	The TCS shall provide the capability to graphically display Line of Sight versus terrain profile (DTED).	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture	
3.2.1.2 Payload Planning Capability			
SSS103	For those payloads identified in Table 3-2, the TCS shall be able to generate payload planning information to be uplinked to the AV separate from a flight route plan.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	I

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS104	The TCS shall provide the system functionality necessary to generate a payload plan that, as a minimum, shall include the following information: <ol style="list-style-type: none"> 1. Payload type 2. Payload commands 3. Payload mode settings 4. Payload pointing commands, manual as well as automated 5. Payload field of view settings, manual as well as automated 	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/TI
SSS541	The TCS shall provide the capability to display the payload swath for the selected payload for planning purposes.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture	
	3.2.1.3 Communications Planning Capability		
SSS105	The TCS shall have the capability to generate a Communications Plan as part of a UAV Mission Plan.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/TI
SSS106	The TCS shall have the capability to receive a communications plan as part of a UAV Mission Plan from a service specific mission planning system as well as another TCS.	ORD041 The TCS shall be capable of downloading mission plans from Service-specific mission planning systems (e.g., Tactical Aircraft Mission Planning System and Air Force Mission Support System).	D/TI
SSS107	A Communications Plan shall include the information which defines the C4I connectivity, as well as the RF Coordination Plan.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	I
	3.2.2 Mission Control And Monitoring Functions		
SSS108	While simultaneously flying two AV's of different types, the TCS shall contain and utilize the control functionality of each AV, and the monitoring capabilities of each of the AV's shall be initiated at an alternating rate of TBD seconds/minutes to perform error analysis and issue warnings when appropriate.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/I

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSSI109	AV specific components used to perform ground based closed loop command and control functions for TCS shall be initialized upon operator selection of a specific AV.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	T
SSSI110	The TCS shall transmit command and control information to the AV via the uplink to the AV	ORD065 The TCS must support a simultaneous uplink and downlink capability.	D/T
SSSI111	TCS shall receive AV telemetry and payload information via downlink from the AV	ORD065 The TCS must support a simultaneous uplink and downlink capability.	D/T
3.2.2.1 AV Control And Monitoring			
Capability			
SSS011	The TCS shall be capable of being interoperable with Predator and Outrider UAVs across the 5 levels of UAV interaction.	ORD025 The TCS shall be capable of being interoperable with different types of UAVs and UAV payloads across the 5 levels of UAV interaction.	D
SSS112	The TCS shall have the capability to sequentially control and monitor multiple AVs.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
SSS113	TCS shall notify the operator when AV performance parameters are out of limits.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
SSS114	The TCS shall provide the capability to pass control of an AV to another TCS as well as an AV specific GCS	ORD050 The TCS shall provide the capability to pass control of an AV from one TCS to another.	D
SSS115	The TCS shall provide the capability to take control of an AV from another TCS as well as an AV specific GCS	ORD050 The TCS shall provide the capability to pass control of an AV from one TCS to another.	D
SSS118	The TCS shall provide the capability to control the AV flight commands as well as to release the AV to an autonomous flight control mode.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
SSS119	AV telemetry data shall be available to support other TCS functions as required.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	I
SSS120	The TCS shall provide the capability to control the flight of the selected AV in accordance with the specific AV's operational performance capabilities.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D/T/A/I

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS121	The TCS shall provide the capability to fully control and display the AV's Identification Friend or Foe (IFF).	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
SSS122	The TCS shall provide the capability to enter AV preset limits which, as a minimum, will include airspeed limits, altitude limits, and fuel limits.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D/TI
	3.2.2.1.1 AV Flight Control Task		
SSS123	DELETED		
SSS124	The TCS shall allow the operator to control an AV using the LOS as well as SATCOM data links.	ORD024 The TCS shall allow operators to have simultaneous flight and payload control of at least two air vehicles, beyond line of sight, using one TCS.	D/T
SSS125	The TCS shall provide the necessary system capabilities required for air vehicle flight control beyond line of sight via uplink command to two air vehicles of the same type using sequential communication techniques.	ORD024 The TCS shall allow operators to have simultaneous flight and payload control of at least two air vehicles, beyond line of sight, using one TCS.	DT/AI
SSS126	The TCS shall only support operation of the AV via all autopilot flight modes, and shall not provide the operator the capability to directly manipulate AV flight surfaces.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D
SSS539	The TCS shall provide the capability to implement an emergency action plan, if supported by the AV, to control the AV during equipment failures.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D/T

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS127	The TCS shall provide interactive displays necessary to command the flight of an AV.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D/T
	3.2.2.1.1 Modes		
SSS128	The TCS shall allow the operator to command the flight behavior characteristics inherent to the selected AV.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D/T
SSS129	The operator shall have the capability to initiate as well as change, to include as a minimum manual override, flight behaviors by sending the proper control commands to the UAV.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D/T
	3.2.2.1.2 AV Navigation Task		
SSS130	The TCS shall have the capability to command the AV to use the navigation methods inherent to the selected AV.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D
SSS131	The operator shall have the capability to initiate as well as change, to include as a minimum manual override, UAV navigation methods by sending the proper control commands to the UAV.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
	3.2.2.1.3 ADT Control Task		
SSS132	The TCS shall provide the functionality to control, monitor, and display the operation of the Air Data Terminal (ADT).	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D/T
	3.2.2.1.3.1 ADT Antenna Control		
SSS133	The TCS shall provide the functionality to control the ADT antenna.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D/T
	3.2.2.1.3.2 ADT Transmitter And Receiver Control		
SSS134	The TCS shall provide the functionality to control the power, transmitter signal strength, and frequencies used by ADT for data link communication.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D/T
	3.2.2.1.4 AV Launch/Recovery Task		
SSS135	The TCS shall support an automatic launch and recovery system.	ORD044 The TCS shall support an automatic launch and recovery system.	D/I
SSS136	The TCS shall be interoperable with the Integrity Beacon Landing System (IBLS)	ORD044 The TCS shall support an automatic launch and recovery system.	D/T
SSS137	The TCS shall be interoperable with the Common Automated Recovery System (CARS)	ORD044 The TCS shall support an automatic launch and recovery system.	D/T
SSS138	The TCS shall present sufficient cues to the operator to implement and monitor automatic launch and recovery, and to initiate abort procedures if required.	ORD044 The TCS shall support an automatic launch and recovery system.	D

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
	3.2.2.1.4.1 Emergency Recovery		
SSS139	The TCS shall allow the operator to initiate the emergency recovery feature of the AV, if the AV has an emergency recovery feature.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	T
	3.2.2.1.5 AV Monitoring Task		D/T
SSS140	TCS shall provide the capability to monitor specific telemetry elements real-time, and record all telemetry elements for future review and processing.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D/T
SSS141	TCS shall provide the capability to monitor AV adherence to the uplinked mission plan, detecting any deviations greater than 10% from projected flight path, and notifying the operator if deviations are detected.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D/T/A/I
SSS142	TCS shall provide the capability to monitor the status of all AV subsystems reporting status.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D/T
	3.2.2.1.5.1 AV Monitoring Displays		
SSS143	The TCS shall display the AV status, to include but not be limited to the AV location and flight and avionics system status.	ORD045 The TCS shall display the location and system status of the UAV.	D
SSS144	When the data link is interrupted, the TCS shall present the last known AV status values and the time at which the last values were reported.	ORD045 The TCS shall display the location and system status of the UAV.	D/T

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS145	The TCS shall be capable of displaying fuel parameters to the operator to include as a minimum, remaining fuel, flow rate, and bingo fuel.	ORD045 The TCS shall display the location and system status of the UAV.	D/T
SSS146	The TCS shall compute the estimated position of the AV during Loss of Link (LOL) based upon the last known AV position and anticipated flight path based on current flight mode (e.g. flight route plan mode, emergency flight route plan mode, maintain current heading mode).	ORD045 The TCS shall display the location and system status of the UAV.	D/T
SSS536	TCS shall display a LOL timer to the operator initiating a LOL onset.	ORD045 The TCS shall display the location and system status of the UAV.	D/T
3.2.2.2 Payload Control And Monitoring			
Capability			
SSS012	The TCS shall be capable of being interoperable with the installed payloads across the 5 levels of UAV interaction.	ORD025 The TCS shall be capable of being interoperable with different types of UAVs and UAV payloads across the 5 levels of UAV interaction.	D
SSS147	The TCS will have the capability to control and monitor the AV payload(s).	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D/T
SSS148	The TCS shall have the capability to receive data from and control payloads on an AV that is being controlled from another TCS.	ORD049 The TCS shall have the capability to receive data from and control payloads on a UAV that is being controlled from another TCS.	D/T
SSS149	The TCS shall provide the necessary system capabilities required for payload control beyond line of sight via uplink command of two air vehicles of the same type using sequential communication techniques.	ORD024 The TCS shall allow operators to have simultaneous flight and payload control of at least two air vehicles, beyond line of sight, using one TCS.	D/T
SSS150	DELETED		
SSS151	The TCS shall receive, process, and present payload data to the operator so that the status of the payload can be determined.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D/T

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
	3.2.2.2.1 Payload Control Task		
SSS152	The TCS shall permit the operator to control the payload using all methods supported by the payload installed in the selected AV.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D
SSS153	The TCS shall provide a graphical user interface display for the purpose of controlling the payload.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D
SSS154	The TCS shall provide override of payload automated as well as preprogrammed inputs.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D/T
	3.2.2.2.2 Payload Monitoring Task		
SSS155	TCS shall provide the capability to monitor payload adherence to the uplinked mission plan.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	T/A
	3.2.2.2.2.1 Payload Monitoring Displays		
SSS156	DELETED.		
SSS157	The TCS shall display the current search footprint and the search history of the payload on the map.	ORD046 The TCS shall display the search footprint of the payload on the moving map.	D

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
3.2.2.3 Data Terminal Control And Monitoring Capability			
SSS158	The TCS shall have the capability to control and monitor a line-of-sight as well as satellite data terminal.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D/T
SSS527	The TCS shall provide the system functionality necessary to record data obtained via the data link.	ORD048 The TCS shall receive, process, store, retrieve flight and payload data, and perform limited exploitation of payload data.	D/TI
3.2.2.3.1 Data Terminal Control Task			
SSS159	The TCS shall be capable of interfacing with the specified data terminal and issuing data link terminal commands required to establish, control, and maintain the data link with a selected AV.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	T/I
SSS160	Data terminal control shall include, but is not limited to, antenna pointing control, transmitter control, and receiver control.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	T
SSS161	The TCS shall be capable of automatically selecting the proper mode of operation for the selected data terminal.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	T

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS162	As a minimum the TCS LOS data terminal control modes shall include acquisition, autotrack, search, manual point, omni directional, as well as directional modes of operation, if applicable to the selected data link.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	T
SSS163	The operator shall be able to manually override any automatic data terminal control mode selection if desired, except during Emission Control (EMCON) and Hazards of Electromagnetic Radiation to Ordnance (HERO) conditions.	ORD036 The TCS shall provide the following survivability mission planning features: a. Provide override of payload and AV automated/preprogrammed inputs.	T
SSS164	The TCS shall support a LOS data link and SATCOM data link capability.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	T
SSS116	For shipboard operations, the TCS shall provide the capability to switch to a second LOS antenna, if a second antenna is available, when desired (e.g. the currently active antenna is masked by shipboard obstructions).	ORD052 The TCS shall enable antenna switching when the UAV is masked by obstructions.	D/T
SSS117	The TCS shall provide the capability to switch to a SATellite COMmunication (SATCOM) antenna, if the selected AV has SATCOM capability, when desire (e.g. the AV proceeds beyond LOS range as well as when LOS is obstructed).	ORD052 The TCS shall enable antenna switching when the UAV is masked by obstructions.	D/T
SSS165	The TCS shall provide an interactive display for the purpose of controlling the data link terminal.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D/T
SSS166	DELETED.	3.2.2.3.1.1 Antenna And Pedestal Control	

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS167	The TCS shall provide automatic pointing commands for directional antennas	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	T
SSS168	The TCS shall allow for the manual pointing of directional antennas when desired by the operator.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D
SSS169	DELETED.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	T
SSS170	The TCS shall be capable of positioning antennas to maintain LOS as well as SATCOM.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D/T
SSS557	The TCS shall incorporate antenna pedestal 3 -axis stabilization to compensate for platform (e.g. ship, or HMMWV) motion, if applicable.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D/T
3.2.2.3.1.2 Transmitter And Receiver Control		ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D
SSS171	The TCS shall be capable of automatically controlling the transmitter and receiver functions of the selected data terminal.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSSI172	The operator shall be able to manually override the automatic function selection of the selected data terminal, if desired	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D
SSSI173	The TCS shall be capable of automatically controlling the transmitter and receiver modes of the selected data terminal.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D
SSSI174	The operator shall be able to manually override the automatic mode selection of the selected data terminal, if desired.	ORD036 The TCS shall provide the following survivability mission planning features: a. Provide override of payload and AV automated/preprogrammed inputs.	D
SSSI175	The TCS shall be capable of automatically controlling the transmitter and receiver frequencies of the selected data terminal.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D
SSSI176	The operator shall be able to manually override the automatic frequency selection if desired.	ORD036 The TCS shall provide the following survivability mission planning features: a. Provide override of payload and AV automated/preprogrammed inputs.	D
3.2.2.3.2 Data Terminal Monitoring Task			
SSSI177	The TCS shall receive, process, and present status data to the operator so that the status of the data terminal and the supported AV data link can be monitored.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
SSSI178	The TCS shall be capable of monitoring and displaying the signal strength of the received and transmitted signals for the selected data terminal.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
SSSI179	The TCS shall be capable of monitoring and displaying the signal quality of the received and transmitted signals for the selected data terminal.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS180	The TCS shall be capable of presenting to the operator a visual depiction of the minimum and maximum data link operational ranges.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
	3.2.3 Payload Product Management Function		
SSS181	DELETED.		
	3.2.3.1 Payload Product Processing Capability		
SSS182	The TCS shall have the functionality to process payload product data from Electro Optical (EO), Infrared (IR), and Synthetic Aperture Radar (SAR) payloads.	ORD048 The TCS shall receive, process, format, store, retrieve flight and payload data, and perform limited exploitation of payload data.	I
SSS183	DELETED.		
SSS184	The TCS shall be able to store up to 24 hours of payload data.	ORD048 The TCS shall receive, process, format, store, retrieve flight and payload data, and perform limited exploitation of payload data.	T
SSS185	The TCS shall be in compliance with Common Imagery Ground Surface Station (CIGSS), United States Imagery Standards (USIS), Video Working Group Standards Architecture, National Imagery Transmission Format (NITF) Version 2.0, and Global Command and Control Systems (GCCS) when processing payload imagery data.	ORD055 The TCS shall be in compliance with Common Imagery Ground Surface Station (CIGSS), United States Imagery Standards (USIS), and GCCS when processing payload imagery data.	T/A
SSS186	The NITF 2.0 imagery files generated by the TCS shall contain the necessary telemetry and support data to permit subsequent imagery exploitation by C4I systems.	ORD055 The TCS shall be in compliance with Common Imagery Ground Surface Station (CIGSS), United States Imagery Standards (USIS), and GCCS when processing payload imagery data.	I
SSS187	The TCS shall have a built-in text entry capability including the ability to annotate textual information on imagery.	ORD057 The TCS shall have a built-in word processing and text capability including the ability to overlay textual information on imagery.	D/T
SSS188	The TCS shall be capable of receiving HAE UAV payload imagery.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	
SSS189	Payload telemetry data shall be available to support other TCS functions as required.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	I

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS190	This functionality, as a minimum, shall include: correlating, formatting, storing, internally routing, and recording the video	ORD054 The TCS capabilities shall include video/SAR frame grabbing, image annotation, image archiving, video/SAR recording playback, and data dissemination.	D
SSS191	This functionality, as a minimum, shall include: creating and storing a freeze frame of the video	ORD054 The TCS capabilities shall include video/SAR frame grabbing, image annotation, image archiving, video/SAR recording playback, and data dissemination.	D
SSS192	This functionality, as a minimum, shall include: retrieving and displaying the video	ORD054 The TCS capabilities shall include video/SAR frame grabbing, image annotation, image archiving, video/SAR recording playback, and data dissemination.	D
SSS193	This functionality, as a minimum, shall include: retrieving a hard copy of freeze frame video.	ORD058 The TCS shall have ports for outputting data and imagery to a hard copy printer and recording media.	D
SSS194	This functionality, as a minimum, shall include: processing digital imagery for export and dissemination	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the UAV and MAE UAV, and support data collection from HAE UAV.	T/I
3.2.3.2 Payload Product Display Capability			
SSS195	The TCS shall display live and recorded imagery data, with as well as without annotation and overlay, upon operator request.	ORD048 The TCS shall receive, process, store, retrieve flight and payload data, and perform limited exploitation of payload data.	D
SSS537	The TCS shall provide the capability to simultaneously view imagery as well as data from more than one payload, when applicable.	ORD048 The TCS shall receive, process, store, retrieve flight and payload data, and perform limited exploitation of payload data.	
SSS196	The TCS operator shall be able to select the content of the overlay information.	ORD048 The TCS shall receive, process, store, retrieve flight and payload data, and perform limited exploitation of payload data.	D
SSS197	The TCS shall have the capability to select and deselect several types of cross hairs (or other similar ICON) to identify a selected point on a target.	ORD062 The TCS shall have the capability to select/deselect cross hairs (or other similar ICON) to identify center of target.	D
SSS198	RS170A video and digital imagery shall be routed to TCS functions and displayed upon operator request.	ORD048 The TCS shall receive, process, store, retrieve flight and payload data, and perform limited exploitation of payload data.	D/T
3.2.3.3 Payload Product Limited Exploitation Capability			
SSS199	DELETED.		

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS200	The TCS shall have the functionality to conduct limited exploitation, to include voice and textual reporting for spot and mission objectives, on the payload product data.	ORD053 The TCS shall provide limited exploitation capabilities, to include voice and textual reporting for spot/mission objectives.	D
SSS201	The image enhancement capability shall include contrast, brightness, edge enhancement, and sharpness.	ORD061 The TCS shall have image enhancement capability.	D
SSS202	The TCS shall provide the capability to capture frozen-frames of imagery and store these frozen images for further review and processing.	ORD054 The TCS capabilities shall include video/SAR frame grabbing, image annotation, image archiving, video/SAR recording playback, and data dissemination.	D/T
SSS203	The TCS shall have the capability to display Near-Real Time (NRT) imagery with overlays to include, as a minimum, date/time group, target location coordinates when the target is in the center of the field of view, north seeking arrow, and AV position and heading.	ORD056 The TCS shall have the capability to display Near-Real Time (NRT) imagery with annotation to include date/time group, target location when in the center field of view, north seeking arrow, AV position and heading.	D
SSS560	The TCS shall provide the capability to compute the range and bearing between two geographic positions located on the payload imagery display.	ORD034 The TCS shall be capable of providing point-and-click route and sensor planning.	
3.2.4 Targeting Function			
SSS204	DELETED.		
SSS205	DELETED.		
SSS206	The TCS shall support a target location function where the operator can request the current ground location of the payload field-of-view center.	ORD056 The TCS shall have the capability to display Near-Real Time (NRT) imagery with annotation to include date/time group, target location when in the center field of view, north seeking arrow, AV position and heading.	D
3.2.4.1 Target Coordinate Development			
Capability			
SSS207	The TCS shall have the functionality to determine the location of items of interest within the payload field of view, and express these locations in coordinates acceptable for military applications.	ORD056 The TCS shall have the capability to display Near-Real Time (NRT) imagery with annotation to include date/time group, target location when in the center field of view, north seeking arrow, AV position and heading.	D/T
3.2.4.2 Target Accuracy Estimation			
Capability			
SSS208	The TCS shall have the functionality to develop an estimate of the error in computed target coordinates, and associate the error estimate with the appropriate target.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T/A/I

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SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
	3.2.5 C4I System Interface Function		

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS209	The TCS shall be capable of entering DII-COE compliant (C4I) networks. [SSS209] Network interoperability will include, but not be limited to: <ol style="list-style-type: none"> 1. Radio data burst connectivity to Automatic Target Hand-off Systems (ATHS) 2. Advanced Field Artillery Tactical Data Systems (AFATDS) 3. Army Deep Operations Coordination System (ADOCS) 4. Wire connectivity to the All Source Analysis System (ASAS) 5. The Intelligence Analysis System (IAS) 6. The Joint Standoff Target Attack Radar System (JSTARS) Ground Station Module/Common Ground Station (GSM/CGS) 7. The Joint Maritime Command Information System (JMCLIS) 8. Closed Circuit Television (CCTV) 9. Advanced Tomahawk Weapons Control Station (ATWCS) 10. Joint Deployable Intelligence Support System (JDISS) 11. Trojan Special Purpose Integrated Remote Intelligence Terminal (SPIRIT) II 12. Joint Service Imagery Processing System (JSIPS) 13. JSIPS Tactical Exploitation Group (JSIPS TEG) 14. Tactical Exploitation System (TES) 15. Service Mission Planners 16. The Theater Battle Management Core System (TBMCs) 17. The Guardrail Common Sensor Aerial Common Sensor (ACS) Integrated Processing Facility (IPF) 18. Modernized Imagery Exploitation System (MIES) 19. Enhanced Tactical Radar Correlator (ETRAC) 20. Contingency Airborne Reconnaissance System (CARS) 21. Common Operational Modeling, Planning, and Simulation System (COMPASS) 	The TCS shall have the capability to distribute NRT video to selected users (including commercially available television monitors and VCRs) via external ports.	T/I

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS210	The TCS shall have the functionality necessary to manage all aspects of C4I system interfaces to include receiving, processing, and transmitting tactical information to include but not limited to character based text messages, NITF 2.0 imagery files, and RS-170A video.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	T/I
SSS211	The TCS shall provide the functionality necessary to interface with various C4I systems in order to satisfy the operational requirements for: [SSS211] <ol style="list-style-type: none"> 1. Tasking TCS to plan and conduct a mission. 2. Presentation of payload product and target coordinates for export and dissemination. 3. Use of UAV obtained data (Non-real time tracks, tactical points and amplifying information) to provide a C4I system with information that may be used by C4I system operators, for transmission on tactical data communication links, and available to support engagement by appropriate weapons systems. 		T/I
SSS212	The TCS shall have the capability to interoperate with a data server to receive, extract, and push intelligence data.	ORD064 The TCS shall have the capability to interoperate with a server to receive, extract, and push intelligence data.	D/T/I
SSS213	The TCS shall have the capability to use cable to deliver live video imagery in multiple locations.	ORD071 The TCS shall have the capability to use cable to deliver live video imagery in multiple locations.	D
SSS214	The TCS shall have the ability to interface with Service specific ground and airborne Ultra High Frequency (UHF), Very High Frequency (VHF), UHF/VHF, and High Frequency (HF) radios for digital message transmission while using the same radios for record traffic.	ORD072 The TCS shall have the ability to use Service specific ground or airborne UHF, VHF, and UHF/VHF radios for digital message transmission while using the same radios for record traffic.	D/T
SSS215	Where applicable, TCS data burst messages shall comply with Variable Message Formats.	ORD116 TCS data burst messages shall comply with Variable Message Formats.	T/I
SSS216	DELETED.		
SSS217	DELETED.		
SSS558	The TCS shall export and disseminate formatted NITF 2.0 files	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	T

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS218	The TCS shall export and disseminate digital imagery.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	T
SSS219	The TCS shall export and disseminate RS-170A video (with or without overlay).	ORD060 The TCS shall have the capability to distribute NRT video to selected users (including commercially available television monitors and VCRs) via external ports.	D
SSS220	The TCS shall export and disseminate tactical communication messages.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
	3.2.5.1 C4I Interface Control Capability		
SSS221	DELETED.		
	3.2.5.1.1 C4I Digital Interface Control		
	Capability		
SSS222	The TCS shall have the functionality to provide the following control capability: 1. Send and receive tactical communication messages	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D
SSS223	The TCS shall have the functionality to provide the following control capability: 2. Send and receive annotated and un-annotated digital imagery	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D
SSS224	The TCS shall have the functionality to provide the following control capability: 3. Establish digital communication and when completed terminate communications to the C4I systems specified in Section 3.2.5.	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D
SSS225	The TCS shall have the functionality to provide the following control capability: 4. Establish and when completed terminate digital communication to peripheral devices..	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D
	Capability		
	3.2.5.1.2 C4I Analog Interface Control		

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS226	The TCS shall have the functionality to provide the following control capability: 1. Send and receive analog imagery in RS-170A format with as well as without overlay.	ORD060 The TCS shall have the capability to distribute NRT video to selected users (including commercially available television monitors and VCRs) via external ports.	D
SSS227	The TCS shall have the functionality to provide the following control capability: 2. Establish and when completed terminate analog communication to C4I systems specified in Section 3.2.5.	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D
SSS228	The TCS shall have the functionality to provide the following control capability: 3. Establish and when completed terminate analog communication to peripheral devices.	ORD060 The TCS shall have the capability to distribute NRT video to selected users (including commercially available television monitors and VCRs) via external ports.	D
SSS229	3.2.5.2 C4I Interface Data Processing Capability 3.2.5.2.1 C4I Digital Interface Data		
SSS230	The TCS shall have the functionality to provide the following digital data processing capability: 1. Create Tactical Communications Messages to include United States Message Text Format (USMTF), Tactical Fire (TACFIRE), Over The Horizon Gold (OTH-Gold), and Intelligence and Electronic Warfare Character Oriented Message Catalog (IEWCOMCAT) For Transmission (specific message types will be identified in the TCS to C4I IIDD)	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSS231	The TCS shall have the functionality to provide the following digital data processing capability: 2. Review Incoming Tactical Communication Messages	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSS232	The TCS shall have the functionality to provide the following digital data processing capability: 3. Prepare Annotated as well as Unannotated Digital Imagery For Transmission	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSS233	The TCS shall have the functionality to provide the following digital data processing capability: 4. Review Incoming Annotated as well as Unannotated Digital Imagery	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS234	All digital messages received by the TCS shall be automatically checked for errors and corrected when possible	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	T/I
SSS235	All erroneous messages that cannot be corrected by TCS shall be flagged to the operator.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSS236	The TCS shall provide the capability to log all incoming and outgoing formatted tactical messages.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	T
	3.2.5.2.2 C4I Analog Interface Data		
	Processing Capability		
SSS237	The TCS shall have the functionality to provide the following analog data processing capability: 1. Prepare annotated as well as unannotated analog imagery for transmission	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSS238	The TCS shall have the functionality to provide the following analog data processing capability: 2. Receive incoming annotated as well as unannotated analog imagery	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
	3.2.5.3 C4I Interface Monitoring Capability		
SSS239	The TCS shall have the functionality to monitor the status of all C4I interfaces, and display appropriate control information.	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D/I
SSS240	The TCS shall have the functionality to provide the following data monitoring capability: 1. Display which C4I systems are supported and online during a mission	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D/T
SSS241	The TCS shall have the functionality to provide the following data monitoring capability: 2. Monitor the status of all incoming and outgoing tactical communication messages	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	T
SSS242	The TCS shall have the functionality to provide the following data monitoring capability: 3. Review all tactical communication messages received and transmitted	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS243	The TCS shall have the functionality to provide the following data monitoring capability: 4. View incoming and outgoing, annotated as well as unannotated analog imagery	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D
SSS244	The TCS shall have the functionality to provide the following data monitoring capability: 5. View incoming and outgoing, annotated as well as unannotated digital imagery messages	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D
	3.2.6 AV Maintenance Function		
SSS245	TCS shall be capable of executing AV maintenance software and displaying appropriate status results.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
	3.2.7 Payload Maintenance Function		
SSS246	TCS shall be capable of executing payload maintenance software and displaying appropriate status results.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
	3.2.8 Data Terminal Maintenance Function		
SSS247	TCS shall be capable of executing data terminal maintenance software and displaying appropriate status results.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
	3.2.9 Workstation And Peripheral Equipment Maintenance Function		
SSS248	TCS shall be capable of executing workstation and peripheral equipment maintenance software and displaying appropriate status results.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
	3.2.10 Fault Detection/Location Function		
SSS249	Fault Detection/Location (FD/L) to the Line Replaceable Unit (LRU) level shall be provided to indicate the readiness status of TCS.	ORD089 The TCS hardware and software shall include FD/L during initial computer system boot-up.	D/T

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS250	As a minimum, TCS shall provide FD/L as part of normal Startup Mode, periodically during Normal Operations and Training Modes, and extensively, if selected, as part of Maintenance Mode.	ORD089 The TCS hardware and software shall include FD/L during initial computer system boot-up.	D/I
SSS251	The TCS shall allow the operator to control and monitor the AV's FD/L	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSS252	The TCS shall allow the operator to control and monitor the Payload's FD/L	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSS253	The TCS shall allow the operator to control and monitor the Data Link FD/L	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
3.2.10.1 Startup FD/L			
SSS254	Startup FD/L in the TCS shall fault detect TBD% of all mission critical failures with a false alarm rate not to exceed TBD%.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T/A
SSS255	Startup FD/L shall isolate TBD% of all detected mission critical failures to a single LRU.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T/A
SSS256	The remaining mission critical failures detected but not isolated by Startup FD/L shall be isolated using manual isolation procedures and technical data provided to the operator by the TCS.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
SSS257	Likewise, Startup FD/L in the TCS shall fault detect TBD% of all non-mission critical failures with a false alarm rate not to exceed TBD%.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T/A
SSS258	Startup FD/L shall isolate TBD% of all detected non-mission critical failures to a single LRU.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T/A

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS259	The remaining non-mission critical failures detected but not isolated by Startup FDL shall be isolated using manual isolation procedures and technical data provided to the operator by the TCS.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
	3.2.10.2 Periodic FDL		
SSS260	Periodic FDL in the TCS shall fault detect TBD% of all mission critical failures with a false alarm rate not to exceed TBD%.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T/A
SSS261	Periodic FDL shall isolate TBD% of all detected mission critical failures to a single LRU.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T/A
SSS262	The remaining mission critical failures detected but not isolated by Periodic FDL shall be isolated using manual isolation procedures and technical data provided to the operator by the TCS.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
SSS263	Likewise, Periodic FDL in the TCS shall fault detect TBD% of all non-mission critical failures with a false alarm rate not to exceed TBD%.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T/A
SSS264	Periodic FDL shall isolate TBD% of all detected non-mission critical failures to a single LRU.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T/A
SSS265	The remaining non-mission critical failures detected but not isolated by Periodic FDL shall be isolated using manual isolation procedures and technical data provided to the operator by the TCS.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
SSS266	Periodic FDL shall never take longer than TBD minutes to execute	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	T
SSS267	Periodic FDL shall periodically execute and update in the background while the system is in the Operations state.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/I
	3.2.10.3 Extensive FDL		

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS268	Extensive FD/L in the TCS shall fault detect TBD% of all mission critical failures with a false alarm rate not to exceed TBD%.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T/A
SSS269	Extensive FD/L shall isolate TBD% of all detected mission critical failures to a single LRU.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T/A
SSS270	The remaining mission critical failures detected but not isolated by Extensive FD/L shall be isolated using manual isolation procedures and technical data provided to the operator by the TCS.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
SSS271	Likewise, Extensive FD/L in the TCS shall fault detect TBD% of all non-mission critical failures with a false alarm rate not to exceed TBD%.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T/A
SSS272	Extensive FD/L shall isolate TBD% of all detected non-mission critical failures to a single LRU.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T/A
SSS273	The remaining non-mission critical failures detected but not isolated by Extensive FD/L shall be isolated using manual isolation procedures and technical data provided to the operator by the TCS.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
SSS274	Extensive FD/L shall allow the operator to select specific tests as well as all tests for execution.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSS275	Extensive FD/L shall inform the operator of the duration of a specific test and periodically, at least once every TBD seconds, delineate the estimated time until completion.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
3.2.11 Software Upgrade Function			
SSS276	The TCS shall allow authorized Operators to install software upgrades via CD-ROM as well as other media storage devices.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS277	The TCS shall restrict Operator access to this capability via password protection.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSS278	The TCS shall provide the capability for Authorized Operators to modify all TCS programmable parameters.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSS279	As a minimum, the TCS shall restrict Operator access to this capability via password protection.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSS280	The TCS shall be capable of importing National Imagery Mapping Agency (NIMA) Digital Terrain Elevation Data (DTED), Digital Feature Analysis Data (DFAD), Arc Digitized Raster Graphic and scanned hard copy maps, via compact disk.	ORD028 The TCS shall be capable of importing NIMA Digital Terrain Elevation Data (DTED), Digital Feature Analysis Data (DFAD), Arc Digitized Raster Graphic and scanned hard copy maps.	D/T
SSS555	The TCS shall be capable of importing map information via operator procedure	ORD029 The TCS shall be capable of importing map information via operator procedure and should be capable of incorporating vector format and Compressed ADRG (CADRG) maps.	D/T
SSS281	The TCS shall be capable of incorporating vector format and Compressed ADRG (CADRG) maps.	ORD029 The TCS shall be capable of importing map information via operator procedure and should be capable of incorporating vector format and Compressed ADRG (CADRG) maps.	D/T
3.2.12 Software Debug And Memory Monitoring			
SSS282	The TCS shall allow an authorized operator to execute a software debug capability and view the resulting diagnostic information.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSS283	As a minimum, the TCS will restrict operator access to this capability via password protection.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSS284	<i>3.3 system external interface requirements</i> DELETED.		

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS285	The TCS shall provide the capability to interface with equipment necessary to provide connectivity with standard DoD tactical (VHF, UHF, and UHF/VHF) radios, Mobile Subscriber Equipment, and military and commercial satellite communications equipment.	ORD109 The TCS shall support direct connectivity to standard DOD tactical (VHF, UHF, and UHF/VHF) radios, Mobile Subscriber Equipment, and military/commercial satellite communications capabilities.	D/I
SSS286	The TCS shall interface with external mission tasking systems (e.g., receive tasking orders, coordinate mission certification).	ORD110 The TCS shall be capable of entering DII-COE compliant (C4I) networks. Network interoperability shall include, but not be limited to: 1. Radio data burst connectivity to Automatic Target Hand-off Systems (ATHS) 2. Advanced Field Artillery Tactical Data Systems (AFATDS) 3. Army Deep Operations Coordination System (ADOCs) 4. Wire connectivity to the All Source Analysis System (ASAS) 5. The Intelligence Analysis System (IAS) 6. The Joint Standoff Target Attack Radar System (JSTARS) Ground Station Module/Common Ground Station (GSM/CGS) 7. The Joint Maritime command Information System (JMCIS) 8. Closed Circuit Television (CCTV) 9. Advanced Tomahawk Weapons Control Station (ATWCS) 10. Joint Deployable Intelligence Support System (JDISS) 11. Trojan Special Purpose Integrated Remote Intelligence Terminal (SPIRT) 12. Joint Service Imagery Processing System (JSIPS) 13. JSIPS Tactical Exploitation Group JSIPS TEG 14. JSIPS Tactical Exploitation System (JSIPS TES) 15. Service Mission Planners 16. The Theater Battle Management Core System (TBMCs) 17. The Guardrail Common Sensor/Aerial Common Sensor (GCS/ACS) Integrated Processing Facility 18. Modernized Imagery Exploitation System (MIES) 19. Enhanced Tactical Radar Correlator (ETRAC) 20. Contingency Airborne Reconnaissance System (CARS) 21. Common Operational Modeling, Planning, and Simulation System (COMPASS)	D/I
SSS287	The TCS shall provide the system functionality necessary to interface with the data terminal.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	T
SSS288	The TCS shall provide the system functionality to allow interfacing with external systems via a local area network.	ORD070 The TCS shall have the capability to connect to a local area network.	T
SSS289	The TCS shall provide external interfaces to launch and recovery systems.	ORD044 The TCS shall support an automatic launch and recovery system.	T/I

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
	3.3.1 Interface Identification		
	3.3.1.1 TCS to C4I		1
SSSS290	For external communications to C4I systems the TCS shall utilize Tactical Communications (TACCOM) which will consist of a set of software modules accessed through an Application Programming Interface (API).	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D/TI
	3.3.1.1.1 TCS to ASAS		
SSSS291	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with ASAS Version TBD.	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D/TI
	3.3.1.1.2 TCS to JSTARS GSM		
SSSS292	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with JSTARS GSM Version TBD.	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D/TI
	3.3.1.1.3 TCS to JMCIS		
SSSS293	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with JMCIS Version TBD.	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D/TI
	3.3.1.1.4 TCS to JSIPS		
SSSS294	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with JSIPS Version TBD.	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D/TI
	3.3.1.1.5 TCS to AFATDS		
SSSS295	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with AFATDS Version TBD.	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D/TI
	3.3.1.1.6 TCS to ADOCS		

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS296	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with ADOCS Version TBD.	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D/TI
	3.3.1.7 TCS to CARS		
SSS297	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with CARS Version TBD.	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D/TI
	3.3.1.8 TCS to CCTV		
SSS298	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with CCTV Version TBD.	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D/TI
	3.3.1.9 TCS to Service Mission Planners		
SSS299	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with Service Mission Planners.	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D/TI
	3.3.1.10 TCS to GCS/ACS		
SSS300	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with GCS/ACS Version TBD.	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D/TI
	3.3.1.11 TCS to JDISS		
SSS301	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with JDISS Version TBD.	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D/TI
	3.3.1.12 TCS to TES		
SSS302	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with TES Version TBD.	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D/TI
	3.3.1.13 TCS to IAS		

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS303	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with IAS Version TBD.	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D/TI
	3.3.1.14 TCS to ATHS		
SSS304	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with ATHS Version TBD.	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D/TI
	3.3.1.15 TCS to ATWCS		
SSS305	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with ATWCS Version TBD.	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D/TI
	3.3.1.16 TCS to Trojan SPIRIT II		
SSS306	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with Trojan Spirit II Version TBD.	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D/TI
	3.3.1.17 TCS to TBMCS		
SSS307	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with TBMCS Version TBD.	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D/TI
	3.3.1.18 TCS to MIES		
SSS308	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with MIES Version TBD.	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D/TI
	3.3.1.19 TCS to ETRAC		
SSS309	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with ETRAC Version TBD.	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D/TI
	3.3.1.20 TCS to COMPASS		

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS310	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with COMPASS Version TBD.	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D/TI
	3.3.1.21 TCS to JSIPS TEG		
SSS311	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with JSIPS TEG Version TBD.	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D/TI
	3.3.1.2 TCS To DT Control		
SSS312	The TCS shall provide interfaces with the respective UAV program-provided data links for command and control and UAV data.	ORD066 The TCS datalink shall provide interfaces with the respective UAV program-provided data links for command and control and UAV data.	D/TI
SSS313	The TCS shall have provisions for supporting both of the following external interfaces: LOS data link, SATCOM data link.	ORD068 The TCS datalink shall support a simultaneous LOS and beyond LOS capability.	D/TI
	3.3.1.3 TCS To Printer		
SSS314	The TCS shall provide an interface between the TCS and an external hard copy printer.	ORD058 The TCS shall have ports for outputting data and imagery to a hard copy printer and recording media.	D/TI
SSS315	The TCS shall as a minimum, allow Operator(s) to print freeze-frame video, C4I Messages, Mission Plans, FDL information, and current map display.	ORD058 The TCS shall have ports for outputting data and imagery to a hard copy printer and recording media.	D
SSS316	The TCS shall have the functionality to output digital message data and imagery to a hard copy printer.	ORD058 The TCS shall have ports for outputting data and imagery to a hard copy printer and recording media.	D
	3.3.1.4 External Data Storage Systems		
SSS317	The TCS shall provide an interface between the TCS and external data storage systems.	ORD059 The TCS shall have a means of inputting data from external data storage systems.	D/TI
SSS318	The TCS shall have the functionality to transfer digital data as well as digital imagery to and from external data storage systems.	ORD059 The TCS shall have a means of inputting data from external data storage systems.	D/I
	3.3.1.5 TCS To External Power		
SSS319	The TCS shall have an interface between the TCS and DoD standard power supply equipment.	ORD078 The TCS shall use standard electrical power sources available within the DOD family of ground mobile, airborne, and shipboard electrical power sources.	D/TI

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS320	The TCS shall have the functionality to connect to the power supply equipment provided in the TCS operating environment.	ORD078 The TCS shall use standard electrical power sources available within the DOD family of ground mobile, airborne, and shipboard electrical power sources.	D/I
	3.3.1.6 TCS To Geopositional Data		D/TI
SSS321	The TCS shall have an interface to a source of current navigation information.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	
	3.4 system internal interface requirements		
	3.4.1 AV Standard Interface		
SSS322	The TCS shall implement an AV Standard Interface that will provide the proper data format to ensure communications with the selected AV.	ORD025 The TCS shall be capable of being interoperable with different types of UAVs and UAV payloads across the 5 levels of UAV interaction.	1
SSS323	This interface shall allow for addition of future AVs and will provide the generic architecture to ensure interoperability.	ORD025 The TCS shall be capable of being interoperable with different types of UAVs and UAV payloads across the 5 levels of UAV interaction.	1
SSS324	The uplink and downlink information passed between the TCS and the AV shall be in accordance with the associated AV documentation.	ORD065 The TCS must support a simultaneous uplink and downlink capability.	1
SSS325	The TCS shall support a concurrent uplink and downlink capability.	ORD065 The TCS must support a simultaneous uplink and downlink capability.	D/TI
	3.4.2 Data Server		
SSS326	The TCS shall provide an internal interface for establishing communications with the data server within TCS.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	1

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS327	This interface shall allow the information from the data server to be made available to other components of the TCS.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	T1
SSS328	The Data Server interface shall support distributed processing capability.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	D/TI
3.4.2.1 Distributed Processing			
SSS329	Remotely hosted applications shall communicate in a client server relationship via the defined data server interface.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	TI
3.4.3 SAR Processor			
SSS330	The TCS shall provide an internal interface for the SAR Processor in order to disseminate SAR information (to include imagery and telemetry) to other components of the TCS.	ORD054 The TCS capabilities shall include video/SAR frame grabbing, image annotation, image archiving, video/SAR recording playback, and data dissemination.	D
3.4.4 Intercom			
SSS331	The TCS shall incorporate an intercom system that provides verbal communication in the situation where there are multiple operators.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
SSS332	The intercom system shall be compatible with service specific voice communication systems.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	TI

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
	3.4.5 VCR		
SSSS3333	DELETED.		D
SSSS3334	The TCS shall allow the Operator(s) to fully control the VCR via the TCS Display input device(s).	ORD048 The TCS shall receive, process, format, store, retrieve flight and payload data, and perform limited exploitation of payload data.	D
SSSS3335	The TCS shall be able to route VCR recorded payload video to the C4I Interfaces.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSSS3336	An RS-170A video interface shall be provided for the system to output and input analog imagery and overlays to and from a Video Cassette Recorder (VCR) for recording and playback.	ORD048 The TCS shall receive, process, format, store, retrieve flight and payload data, and perform limited exploitation of payload data.	D
	3.4.6 Printer		
SSSS3337	The TCS shall have ports for outputting data and imagery to an internal hard copy printer.	ORD058 The TCS shall have ports for outputting data and imagery to a hard copy printer and recording media.	I/T
SSSS3338	The TCS shall, as a minimum, allow the Operator(s) to print freeze-frame video, C4I Messages, Mission Plans, FD/L information, and current map display to an internal printer.	ORD058 The TCS shall have ports for outputting data and imagery to a hard copy printer and recording media.	D
	3.4.7 Data Storage Devices		
SSSS3339	The TCS shall be able to access data storage devices.	ORD059 The TCS shall have a means of inputting data from external data storage systems.	D
SSSS3340	The TCS shall have the functionality to transfer digital data as well as digital imagery to and from data storage devices.	ORD059 The TCS shall have a means of inputting data from external data storage systems.	D/I
	3.4.7.1 CD Drive		
SSSS3341	The TCS shall provide a read and write CD drive for storage and retrieval of TCS data.	ORD028 The TCS shall be capable of importing NIMA Digital Terrain Elevation Data (DTED), Digital Feature Analysis Data (DFAD), Arc Digitized Raster Graphic and scanned hard copy maps.	D/I
	3.4.7.2 Tape Drive		
SSSS3342	The TCS shall provide a tape drive for storage and retrieval of TCS data.	ORD022 The TCS shall have peripheral ports to drive external devices. As a minimum, ports required will be for monitor displays, mouse (or pointer device), keyboard, LAN, EIA-RS-170, and external disk drives (if required)	D/I

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
3.4.7.3 Redundant Array Of Inexpensive Disks			
SSSS343	The TCS shall provide a RAID for storage and retrieval of TCS data.	ORD022 The TCS shall have peripheral ports to drive external devices. As a minimum, ports required will be for monitor displays, mouse (or pointer device), keyboard, LAN, EIA-RS-170, and external disk drives (if required)	D/I
3.4.8 Uninterruptible Power			
SSSS344	The TCS shall have an interface to an uninterrupted power supply.	ORD080 The TCS shall have an uninterrupted power supply for critical phases (landing and takeoff as a minimum) of mission execution.	D/I
3.5 System Internal Data Requirements			
3.6 Adaptation Requirements			
3.7 Safety Requirements			
SSSS345	The TCS design shall consider all safety requirements affecting design and performance except nuclear safety	ORD099 TCS system safety and health hazards, if any, shall be identified and evaluated.	A/I
SSSS346	The TCS safety requirements are intended to eliminate as well as control potential hazards to equipment and personnel involved in the TCS. The TCS shall comply with para 5.3 of MIL-STD 882C, "System Safety Program Requirements", dated 19 January 1993 w/ Notice 1 dated 19 January 1996.	ORD100 TCS risk levels and a program to manage the probability and severity of hazards shall be developed.	A/I
3.7.1 Air Vehicle Safety			
SSSS347	The TCS shall provide sufficient cues to allow the operator to safely take-off, land and navigate under Instrument Flight Rules.	ORD043 The TCS shall be ergonomically designed and provide sufficient cues to allow the pilot to safely take off, land, and navigate under Instrument Flight Rules.	D
SSSS348	The TCS shall provide adequate capability to allow the operator to operate each UAAV within its certified operational flight envelope.	ORD043 The TCS shall be ergonomically designed and provide sufficient cues to allow the pilot to safely take off, land, and navigate under Instrument Flight Rules.	D/I
SSSS349	Appropriate cautions and warnings shall be provided to the operator if the air vehicle deviates into unsafe flight regime.	ORD043 The TCS shall be ergonomically designed and provide sufficient cues to allow the pilot to safely take off, land, and navigate under Instrument Flight Rules.	D

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS350	For mission planning, the TCS shall provide terrain avoidance warning and minimum reception altitude calculations for line of sight flights.	ORD043 The TCS shall be ergonomically designed and provide sufficient cues to allow the pilot to safely take off, land, and navigate under Instrument Flight Rules.	D/I
SSS351	During mission execution, the TCS shall provide the operator a cautions and warnings when the UAV system has identified a malfunction.	ORD043 The TCS shall be ergonomically designed and provide sufficient cues to allow the pilot to safely take off, land, and navigate under Instrument Flight Rules.	D
SSS352	The TCS shall provide the required information to allow the operator to maintain safe separation from other aircraft and a safe altitude in civilian airspace per Federal Aviation Administration (FAA) rules.	ORD043 The TCS shall be ergonomically designed and provide sufficient cues to allow the pilot to safely take off, land, and navigate under Instrument Flight Rules.	D/I
SSS353	The TCS shall be designed such that no single hardware failure results in an unsafe command to be transmitted to the air vehicle.	ORD043 The TCS shall be ergonomically designed and provide sufficient cues to allow the pilot to safely take off, land, and navigate under Instrument Flight Rules.	D/T/I
SSS3556	The TCS shall be designed such that no single software error results in an unsafe command to be transmitted to the air vehicle.	ORD043 The TCS shall be ergonomically designed and provide sufficient cues to allow the pilot to safely take off, land, and navigate under Instrument Flight Rules.	D/T/I
SSS354	The TCS shall be capable of restoring power in sufficient time to avoid loss of air vehicle control during power outages.	ORD079 The TCS shall be capable of restoring power in sufficient time to avoid loss of critical mission data or loss of air vehicle control during power outages.	D/T
SSS355	The TCS shall monitor the uplink and downlink to each UAV under its control.	ORD043 The TCS shall be ergonomically designed and provide sufficient cues to allow the pilot to safely take off, land, and navigate under Instrument Flight Rules.	I
SSS356	Upon detection of loss of link, the TCS shall attempt to reestablish communications with the air vehicle.	ORD043 The TCS shall be ergonomically designed and provide sufficient cues to allow the pilot to safely take off, land, and navigate under Instrument Flight Rules.	D
3.7.2 Human Safety			
SSS357	The TCS design shall provide protection against injury to TCS operators and maintenance personnel.	ORD099 TCS system safety and health hazards, if any, shall be identified and evaluated.	A/I
SSS358	The system design shall use MIL-STD-2036, Section 5.1.3.11 as a guide, with regard to personnel hazards, and MIL-STD-1472D, Section 5.1.3, as a guide for safety from a human engineering viewpoint.	ORD099 TCS system safety and health hazards, if any, shall be identified and evaluated.	A/I
3.7.3 System Safety And Health Hazard Assets			
SSS359	System safety and health hazards, if any, shall be identified and evaluated during Phase I of the TCS development.	ORD099 TCS system safety and health hazards, if any, shall be identified and evaluated.	A/I
SSS360	Risk levels and a program to manage the probability and severity of hazards shall also be developed.	ORD100 TCS risk levels and a program to manage the probability and severity of hazards shall be developed.	A/I

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
3.8 security and privacy requirements			
SSSS361	The TCS is an Automated Information System (AIS). Therefore, as per DoD Regulation 5000.2-R, dated March 15, 1996, the TCS shall meet security requirements in accordance with DoD Directive 5200.28(D), "Security Requirements for Automated Information Systems" dated March 21, 1988.	ORD027 The TCS shall be capable of meeting the operational and physical security requirements of the systems with which it is interoperable.	A/I
SSSS362	The TCS shall be accredited by the Designated Approving Authority prior to processing classified as well as sensitive unclassified data.	ORD027 The TCS shall be capable of meeting the operational and physical security requirements of the systems with which it is interoperable.	A/I
3.8.1 Computer Security			
SSSS363	Using risk assessment procedures defined in DoD 5200.28(D), a risk index and the minimum security requirements for TCS shall be determined.	ORD027 The TCS shall be capable of meeting the operational and physical security requirements of the systems with which it is interoperable.	A/I
SSSS364	The TCS data sensitivities shall be determined by the data sensitivities of the systems with which it interfaces, to include the air vehicles, payloads, and C4I systems.	ORD027 The TCS shall be capable of meeting the operational and physical security requirements of the systems with which it is interoperable.	A/I
3.8.2 Communications Security			
SSSS365	Links that provide communications between the TCS and other systems shall be secured in a manner appropriate for the sensitivities of the material passed through such links, in accordance with DoD Directive C-5200.5, "Communication Security (COMSEC)" dated 21 April 1990.	ORD027 The TCS shall be capable of meeting the operational and physical security requirements of the systems with which it is interoperable.	T/A/I
3.8.3 Physical Security			
SSSS366	The TCS shall be designed to protect its communication and data links against enemy Electronic Warfare (EW) threats, physical anti-radiation weaponry and physical destruction.	ORD027 The TCS shall be capable of meeting the operational and physical security requirements of the systems with which it is interoperable.	D/T
SSSS367	All hardware, software, documentation, and sensitive information processed by TCS shall be physically protected, minimally at the level determined by the risk index computed in Section 3.8.1, to prevent intentional as well as unintentional disclosure, destruction, and modification.	ORD027 The TCS shall be capable of meeting the operational and physical security requirements of the systems with which it is interoperable.	D/I

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS368	The TCS shall be approved for operation at the same level as the systems with which it interfaces.	ORD027 The TCS shall be capable of meeting the operational and physical security requirements of the systems with which it is interoperable.	I
	3.8.4 Personnel Security		
SSS369	All TCS users, operators, maintainers and other personnel having access to TCS shall be cleared to the highest sensitivity of the data that the TCS processes, stores and transfers.	ORD027 The TCS shall be capable of meeting the operational and physical security requirements of the systems with which it is interoperable.	I
SSS370	Additional local site procedures shall be developed to prevent the intentional or unintentional disclosure of sensitive information to unauthorized individuals.	ORD027 The TCS shall be capable of meeting the operational and physical security requirements of the systems with which it is interoperable.	I
SSS371	A training program consisting of an initial security training and awareness briefing covering AIS security in general but also tailored to the TCS shall be developed.	ORD027 The TCS shall be capable of meeting the operational and physical security requirements of the systems with which it is interoperable.	I
	3.8.5 Privacy Requirements		
	3.9 System Environment Requirements		
SSS372	The TCS shall be capable of operation within environments specified in the System/Subsystem Design Document for the land-based shelter and shipboard environments.	ORD082 The TCS shall operate in world wide climatic conditions, i.e. same climatic conditions in which the TCS shelter/platform is designed to operate.	D/T/I
SSS373	The TCS hardware shall be mounted as well as ruggedized to withstand inter- and intra theater movement.	ORD107 The TCS hardware shall be mounted and/or ruggedized to withstand inter and intra theater movement.	T/I
	3.10 Resource Requirements		
	3.10.1 Hardware Requirements		
SSS374	The hardware of the TCS shall be capable of being scaled as well as being modular to meet the varying needs of the Services.	ORD064 The hardware of the TCS shall be capable of being scaled or being modular to meet the varying needs of the Services.	D/I
SSS375	The TCS hardware shall allow for long range communications from one TCS to another	ORD007 The TCS hardware shall allow for long range communications from one TCS to another.	D/I
SSS376	The TCS hardware shall allow for data storage expansion.	ORD008 The TCS hardware shall allow for data storage expansion.	D/I
SSS377	The TCS hardware shall allow access to other computers to share in processing capability.	ORD009 The TCS hardware shall allow for access to other computers to share in processing capability.	D/I

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS378	The TCS hardware shall allow for multiple external peripherals.	ORD010 The TCS hardware shall allow for multiple external peripherals.	D/I
SSS379	The TCS hardware shall support the data rate characteristics of the AV, data link and payload to ensure interoperability.	ORD067 The TCS datalinks shall comply with CDL standards to ensure interoperability.	D/T
SSS380	For each OUTRIDER system, the TCS shall provide full independent computer redundancy.	ORD074 For each TUAV system, the TCS shall provide full independent computer redundancy.	D/T/I
SSS381	The TCS shall conform with the National Institute for Standard Technology (NIST) Federal Information Processing Standard (FIPS) Publication 151-2 (POSIX.1).	ORD101 The TCS shall conform with the National Institute for Standard Technology (NIST) Federal Information Processing Standard (FIPS) Publication 151-2 (POSIX.1)	T/I
3.10.1.1 Performance			
SSS382	The TCS shall have sufficient throughput to support the processing requirements the selected data link.	ORD065 The TCS must support a simultaneous uplink and downlink capability.	D/T/A
3.10.1.2 Mass Storage			
SSS383	To meet growth requirements, the TCS shall be capable of adding additional storage without major hardware reconfiguration.	ORD104 To meet growth requirements, the TCS should be capable of adding additional storage without a major hardware reconfiguration.	D/T/A
SSS384	The TCS computer system shall contain a CD-ROM drive that is compatible with National Imagery and Mapping Agency (NIMA), CD-ROM Digital Terrain Elevation Data (DTED), Digital Feature Analysis Data (DFAD), and embedded training media.	ORD028 The TCS shall be capable of importing NIMA Digital Terrain Elevation Data (DTED), Digital Feature Analysis Data (DFAD), Arc Digitized Raster Graphic and scanned hard copy maps.	D/I
3.10.1.3 Power			
SSS385	The TCS shall use standard military worldwide 110/220 volt 50/60 hertz generators and commercial power sources.	ORD077 The TCS shall use standard military worldwide 110/220 volt 50/60 hertz generators and commercial power sources.	D/T
SSS386	The TCS shall use standard electrical power sources available within the DoD family of ground mobile, airborne, and shipboard electrical power sources.	ORD078 The TCS shall use standard electrical power sources available within the DOD family of ground mobile, airborne, and shipboard electrical power sources.	D/T
SSS387	The TCS shall be capable of restoring power in sufficient time to avoid loss of critical mission data and loss of air vehicle control during power outages.	ORD079 The TCS shall be capable of restoring power in sufficient time to avoid loss of critical mission data or loss of air vehicle control during power outages.	D/T
SSS388	The TCS shall have an uninterrupted power supply for critical phases (landing and takeoff as a minimum) of mission execution.	ORD080 The TCS shall have an uninterrupted power supply for critical phases (landing and takeoff as a minimum) of mission execution.	D/T

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
3.10.2 Hardware Resource Utilization Requirements			
SSSS389	The TCS throughput shall not exceed 50% of the throughput capability delivered over any 10 second period.	ORD105 The TCS throughput shall not exceed 50% of throughput capability delivered. Throughput should not exceed 25% of throughput capability delivered (objective).	T/A
SSSS390	The TCS throughput shall not exceed, as an objective, 25% of throughput capability delivered over any 10 second period.	ORD105 The TCS throughput shall not exceed 50% of throughput capability delivered. Throughput should not exceed 25% of throughput capability delivered (objective).	T/A
SSSS391	The TCS shall be capable of providing a 50% spare memory storage capacity over delivered storage used.	ORD102 The TCS shall be capable of providing a 50% spare memory storage capacity over delivered storage used.	I
SSSS392	The TCS shall be capable of providing a 75% spare memory storage capacity over storage used (objective).	ORD103 A 75% spare memory storage capacity over storage used is desired.	I
3.10.3 Computer Software Requirements			
SSSS393	The TCS shall have software based on Defense Information Infrastructure/Common Operating Environment per Secretary of Defense for Command, Control, Communications, and Intelligence (ASD(C3I)) Joint Communications, and Intelligence (ASD(C3I)) Joint Technical Architecture (JTA).	ORD018 The TCS shall have software based on Defense Information Infrastructure/Common Operating Environment per Assistant Secretary of Defense for Command, Control, Communications, and Intelligence (ASD(C3I)) Joint Technical Architecture (JTA).	I
SSSS394	The TCS shall comply with the Assistant Secretary of Defense (C3I) Joint Technical Architecture (JTA). This includes, but is not limited to, the language, the computer, database, architecture, and interoperability.	ORD106 The TCS shall comply with the Assistant Secretary of Defense (C3I) Joint Technical Architecture (JTA). This includes, but is not limited to, the language, the computer, database, architecture, and interoperability.	D/I
SSSS395	The TCS shall provide an open software architecture to be capable of supporting additional CSCIs, CSCs, and CSUs for future AVs, future payloads, and payload capabilities (e.g., auto-search and automatic target tracking), and future Tactical UAVs.	ORD017 The TCS shall provide an open software architecture that can support future UAVs.	I
SSSS396	The TCS core software shall be generically written to provide level one through level five interaction for both Outrider and Predator UAVs and establish the architecture for future tactical UAVs.	ORD013 The TCS core software shall be generically written to provide Level Five interaction for both UAV and MAE UAVs and establish the architecture for future tactical UAVs.	I
SSSS397	The TCS software shall provide the UAV operator with the necessary tools for computer related communications, mission tasking, mission planning, mission execution, data receipt, data processing, and data dissemination.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the UAV and MAE UAV, and support data collection from HAE UAV.	D/I
SSSS398	The TCS software shall be capable of being hosted on a variety of computer operating systems that are organic to the various Services.	ORD003 The TCS software shall have an open architecture and be capable of being hosted on computers that are typically supported by the using Service.	D/I

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS399	The TCS software shall be capable of being hosted on a variety of computer operating systems that are organic to the various Services.	ORD021 The TCS HCI shall be menu driven and have displays in a X-windows motif.	D/I
SSS400	The TCS software shall be non-proprietary and have unlimited data rights.	ORD005 The TCS software shall be non-proprietary.	I
SSS401	The TCS's operating system and executable software shall be re-programmable without hardware disassembly.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission planning, execute the mission, and collect, process, and disseminate data for the UAV and MAE UAV, and support data collection from HAE UAV.	D/I
SSS402	Training software shall be alterable without affecting the configuration of the operational software.	ORD096 The TCS system shall provide, for the operator and maintainer, the capability for incorporation of embedded / add-on interactive training with self-paced instruction, duplicating UAV flight performance characteristics, capabilities, and limitations	I
SSS403	The TCS software shall restrict the operator(s) from exercising levels of interaction not achievable by the system.	ORD015 The TCS shall prevent users from entering levels of interaction for which they are not authorized by software and/or hardware configuration.	D/I
3.10.3.1 Workstation			
SSS404	The TCS software shall provide a high resolution, computer generated, graphical user interface that enables the UAV operator that is trained on one system to control different types of UAVs as well as UAV payloads with minimal additional training.	ORD002 The TCS software shall provide a high resolution, computer generated, graphical user interface that enables the UAV operator that is trained on one system to control different types of UAVs or UAV payloads with minimal additional training.	D/A
SSS405	Each control console shall have, at a minimum, the capability to display the following four display windows: (1) display to provide aircraft position, TCS position, flight path, and a waypoint graphics in the foreground which are positioned in relation to a map displayed in the background, (2) display to provide aircraft flight data or payload data in the foreground, and downlinked video in the background, (3) display to provide graphic presentations of downlinked telemetry data, and (4) display to present the interface menus for workstation software.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission planning, execute the mission, and collect, process, and disseminate data for the UAV and MAE UAV, and support data collection from HAE UAV.	D
3.10.4 Computer Communication Requirements			
SSS406	The TACCOM segment shall provide a consistent and common set of interfaces for United States Message Text Format (USMTF), Army Tactical Command Control System (ATCSS), and Field Artillery Tactical Data Systems (FATDS) message sets.	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D/I

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS407	The TACCOM segment shall provide external interfaces for the communications media as indicated in Table 3.10.4-1:	ORD069 The TCS shall be interoperable with C4I systems listed in the ORD.	D/I
SSS408	The TACCOM segment shall provide APIs for the transmission of imagery in National Imagery Transmission Formats 1.1a and 2.0 as per MIL-STD-2500 and to be compatible with the Common Imagery Ground/Surface Station (CGIS) Guidelines.	ORD055 The TCS shall be in compliance with Common Imagery Ground Surface Station (CIGSS), United States Imagery Standards (USIS), and GCCS when processing payload imagery data.	D/I
	3.11 System Quality Factors		
	3.11.1 Functionality		T/A
SSS409	The TCS data latency shall not be greater than that present in the Predator ground control station or Outrider ground control station, whichever is smaller.	ORD011 The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	
	3.11.2 Reliability		D/T/A
SSS410	The TCS reliability will be considered in every phase of the design and development process and shall achieve a system reliability (Mean Time Between Failures MTBF) equal to or greater than that which is specified in the Predator and Outrider ORDs.	ORD073 The TCS shall meet the mission capability criteria established by the MAE UAV and TUAV ORDs.	
	3.11.3 Maintainability		D/T/A
SSS411	The TCS maintainability will be considered in every phase of the design and development process and shall achieve a system maintainability (Mean Time To Repair MTTR) equal to or greater than that which is specified in the Predator and Outrider ORDs.	ORD073 The TCS shall meet the mission capability criteria established by the MAE UAV and TUAV ORDs.	

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS412	The Design features shall be included to: <ol style="list-style-type: none"> 1. minimize the number and frequency of required preventive maintenance actions based on performance requirements and lowest life cycle costs; 2. minimize the contribution to degradation of TCS equipment reliability as a consequence of performing either preventive as well as corrective maintenance; 3. enable the performance of all maintenance actions with safety and comparative ease by providing adequate access to all equipment components and minimizing the requirements for special tools and test equipment; 4. minimize the requirement for specially trained maintenance personnel; 5. improve system availability by the effective selection and incorporation of Built In Test Equipment (BITE); 6. allow removal and replacement of replaceable units without soldering and unsoldering. 	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAF UAV.	D/T/A
SSS413	3.11.4 Availability The TCS equipment shall achieve an availability (A_{d}), as defined below, equal to or greater than that which is specified in the Predator and Outrider ORDs.	ORD073 The TCS shall meet the mission capability criteria established by the MAE UAV and TUAV ORDs.	D/T/A
SSS414	3.11.5 Flexibility The total, fully useable, addressable, physically present program instruction memory and data storage memory for each processor shall have at least 20% unused memory during the Normal Operations Mode over any 10 second period.	ORD102 The TCS shall be capable of providing a 50% spare storage capacity over delivered storage used.	D/T/A

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS415	The processing speed of each processor shall be such that at least 50% of the throughput of each processor remains unused over all 10 second periods and at least 20% of the throughput of each processor remains unused over one second periods regardless of the system function performed.	ORD105 The TCS throughput shall not exceed 50% of throughput capability delivered. Throughput should not exceed 25% of throughput capability delivered (objective).	D/T/A
SSS416	The I/O channel reserve capability for each processor shall have at least a 50% reserve, addressable and useable, I/O channel capacity over any 10 second period.	ORD105 The TCS throughput shall not exceed 50% of throughput capability delivered. Throughput should not exceed 25% of throughput capability delivered (objective).	D/T/A
SSS417	TCS software flexibility and expandability shall be provided through use of the DII COE and through use of standardized software development practices.	ORD004 The TCS software shall be Defense Information Infrastructure/Common Operating Environment compliant.	I
	3.11.6 Portability		
SSS418	Hardware and software shall be selected for use in the TCS with the goal of providing ease of future changes to the TCS elements.	ORD084 The TCS software shall be capable of being hosted on a variety of computers. (DELETE-ORD)	I
SSS419	The selection of processors, interface cards for communication interfaces, disk drives, video, networking equipment, and all other hardware for use in the TCS shall be made according to standards for production of an open architecture.	ORD003 The TCS software shall have an open architecture and be capable of being hosted on computers that are typically supported by the using Service.	I
SSS420	The selection of operating system and programming language for use in the TCS shall be made according to standards for development of an open architecture.	ORD003 The TCS software shall have an open architecture and be capable of being hosted on computers that are typically supported by the using Service.	I
	3.11.7 Reusability		
	3.11.8 Testability		
SSS421	Testability shall be considered in the design and development of the TCS.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	I
SSS422	The system shall be functionally and physically partitioned to allow for efficient fault isolation.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	T/A/I
SSS423	Control over internal items and devices shall be provided for detecting and isolating internal faults.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS424	Test points and data paths shall be defined to support efficient fault isolation.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	T/I
	3.11.9 Usability		
	3.12 design and construction constraints		
SSS425	The TCS shall provide the common software architecture for TCS interaction with Predator, Outrider, and future Tactical UAVs.	ORD086 The TCS shall provide the common software architecture between MAE UAV, TUAV, and future Tactical UAVs.	I
SSS426	In the selection of hardware design solutions to satisfy the requirements herein, Non-Developmental Items (NDI) (off-the-shelf equipment previously approved for service use) shall be chosen to the maximum practicable extent.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	I
	3.12.1 Documentation		
SSS427	System documentation shall be developed as part of the TCS program and will follow MIL-STD-498 for format.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	I
SSS428	The documentation developed shall contain sufficient level of detail to identify the functional, operational and design requirements of the TCS.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	I
SSS429	The documentation shall contain sufficient technical detail to define the hardware and software design implemented to satisfy the system requirements.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	I

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS430	The TCS documentation shall include: [SSS430] <ol style="list-style-type: none"> 1) The TCS System/Subsystem Specification (SSS) 2) The TCS System/Subsystem Design Document (SSDD) 3) The TCS Software Requirements Specification (SRS) (1 for each CSCI) 4) The Software Design Document (SDD) (1 for each CSCI) 5) The TCS Hardware Design Document (HDD) 6) Interface Design Document (IDD) for all interfaces 7) TCS Version Description Document(s) (VDD) 	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	I
	3.12.2 Materials		
SSS431	TCS material factors shall be governed by the NDI, GFE and COTS specifications developed by the equipment manufacturers, where applicable.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	I
	3.12.3 Electromagnetic Radiation		
SSS432	During Phase 1, control techniques to minimize electromagnetic interference, emanation, and susceptibility shall be used in the design of TCS equipment.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	T
SSS433	DELETED.		
SSS434	There shall be neither unacceptable response nor malfunction of any TCS and associated equipment due to EMI produced by any as well as all of the TCS and equipment associated with the TCS.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	T
SSS435	The TCS shall be compatible with the external electromagnetic environment that is typical of the service specific environment in the TCS will be operated.	ORD082 The TCS shall operate in world wide climatic conditions, i.e. same climatic conditions in which the TCS shelter/platform is designed to operate.	T

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS436	The TCS design shall ensure that personnel, fuel, and ordnance are not exposed to electromagnetic radiation as a result of operating the TCS.	ORD099 TCS system safety and health hazards, if any, shall be identified and evaluated.	T
	3.12.4 Software		
SSS437	Newly designed software shall be developed in accordance with a tailored MIL-STD-468.	ORD013 The TCS core software shall be generically written to provide Level Five interaction for both TUAV and MAE UAVs and establish the architecture for future tactical UAVs.	I
SSS438	Software written for other systems shall be used in TCS where it is determined that the existing software is suitable for use within the TCS software.	ORD003 The TCS software shall have an open architecture and be capable of being hosted on computers that are typically supported by the using Service.	I
SSS439	A modular architecture shall be used by the TCS software in order to support future interoperability with multiple types of UAVs and payloads while maintaining consistent displays and user interfaces.	ORD023 The TCS shall be capable of supporting additional software modules for future payloads, payload capabilities (e.g. autosearch and automatic target tracking), and future Tactical UAVs.	I
	3.12.5 Hardware		
SSS440	TCS hardware flexibility and expansion shall be provided through use of GFE, NDI and COTS hardware designed to be upgraded and expanded.	ORD001 The TCS shall have the capability to be configured and down-scaled to meet the user's deployability or operator limitations.	I
	3.12.6 Responsiveness		
SSS441	After emplacement at the operational site, the TCS shall be capable of planning and launching a mission within 1 hour of tasking.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
	3.12.7 Endurance		
SSS442	The TCS shall be capable of operating continuously in functional Operation Mode for a minimum of 72 hours.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D/T
	3.13 Personnel-Related Requirements		
	3.13.1 Human Factors Engineering (HFE)		

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS443	The TCS shall have ergonomically designed operator controls and displays for the 5 th percentile female to 95 th percentile male operator.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture.	T/A
SSS444	The controls shall allow the air vehicle and payload operators to perform mission control, mission monitoring, and mission updates and modifications while wearing cold weather clothing and in a Mission Oriented Protective Posture.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture.	D/T
SSS445	The TCS shall provide the operator a caution and warning diagnostic when the TCS system has identified a malfunction.	ORD051 The TCS shall provide the operator a caution/warning when the UAV system has identified a malfunction.	D/T
SSS446	The TCS shall have monitor(s) that provide easy reading of displays under direct sunlight and low light level environments.	ORD020 The TCS shall have monitor(s) that provide easy reading of displays.	D
SSS447	The TCS HCI shall be implemented using X-windows.	ORD021 The TCS HCI shall be menu driven and have displays in a X-windows motif.	D/I
SSS448	When performing a given task during mission execution, the operator shall be given appropriate warning messages from other concurrently-executing subsystem tasks.	ORD051 The TCS shall provide the operator a caution/warning when the UAV system has identified a malfunction.	D/T
SSS449	TCS Warning messages shall be color coded and flashed based on mission criticality. The color codes and flash frequencies will follow MIL-STD 1472 guidelines.	ORD051 The TCS shall provide the operator a caution/warning when the UAV system has identified a malfunction.	D/I
SSS450	The TCS operator shall be required to enter an acknowledgement prior to disabling of critical warning flags for any AV, Payload, ADT, GDT, and TCS faults.	ORD051 The TCS shall provide the operator a caution/warning when the UAV system has identified a malfunction.	D
SSS451	DELETED.		
SSS452	Visual alerts to the TCS operator shall be in the form of a displayed message box that has a display priority greater than other existing windows to ensure that it is viewable immediately by the operator.	ORD051 The TCS shall provide the operator a caution/warning when the UAV system has identified a malfunction.	D/T
SSS453	The position of the displayed message window shall be easily adjustable by the operator to ensure that important mission data is not obscured.	ORD051 The TCS shall provide the operator a caution/warning when the UAV system has identified a malfunction.	D
SSS454	In addition to displayed alert messages to the TCS operator, auditory alerts to include tones shall also be provided.	ORD051 The TCS shall provide the operator a caution/warning when the UAV system has identified a malfunction.	D
SSS455	The volume of these auditory tones shall be adjustable by the operator via keyboard and trackball input to at least 20dB above the speech interference level at the operator's ear.	ORD051 The TCS shall provide the operator a caution/warning when the UAV system has identified a malfunction.	D/T
SSS456	All TCS warning messages and HCI actions shall be archived for later review.	ORD051 The TCS shall provide the operator a caution/warning when the UAV system has identified a malfunction.	D/T

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS457	All TCS operator inputs shall be error checked such that any erroneous operator entry will not cause current processing to terminate.	ORD051 The TCS shall provide the operator a caution/warning when the UAV system has identified a malfunction.	D/T
SSS458	The HCI shall prompt the operator for a valid input.	ORD051 The TCS shall provide the operator a caution/warning when the UAV system has identified a malfunction.	D/T
SSS459	Display jitter and flicker shall not be perceptible by the operator.	ORD020 The TCS shall have monitor(s) that provide easy reading of displays.	D/T
SSS460	DELETED.		
SSS461	The TCS shall facilitate Human-Computer Interfaces (HCIs) that support operation of all system modes, functions, and capabilities.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture	I
SSS462	The Human Computer Interface (HCI) shall be designed and implemented in accordance with the <u>HCI Design Approach</u> for the UAV TCS document.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture	I
SSS463	The HCI shall provide redundancy in all operations, so that the loss of any one HCI input device does not prohibit operation of any TCS function.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture	D/T
SSS464	The TCS shall provide the functionality to display all HCI elements on any available monitor on the TCS workstation.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture	D/T
SSS465	The TCS shall be capable of displaying a window within a window format to include, as a minimum, displaying a video window overlaid on a map screen as well as a map screen overlaid on a video screen.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture	D
SSS466	The TCS shall provide full complementary control operations from the keyset as well as the X/Y control device (e.g., trackball, mouse, joystick).	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture	D/T
SSS467	The TCS shall provide access to the DII Style Manager so that pointing device characteristics can be modified.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture	D/TI
SSS559	The TCS shall provide the functionality to have a maximum delay time of TBD from operator command to system acknowledgment and response.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture	D/TI

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS468	The TCS shall provide a capability for porting an off-the-shelf, complex control joystick with at least two X/Y control devices, multiple toggle and multi-position switches as part of the TCS hardware suite.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture	D/TI
SSS469	The TCS shall use graphical representations to convey information, such as system status, C4I links, and AV-GDT links.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform cold weather clothing or in a Mission Oriented Protective Posture	D/I
SSS470	The TCS shall provide for multi-level information display tailoring by the operator.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture	D
SSS471	The TCS shall provide automated TCS system information, control options, and logical & simple operator guidance and support for immediate and adaptive responding to crisis situations.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture	D/T
SSS472	The TCS shall provide maximum automated system software support to system status monitoring and alerting of the TCS operator when a preset system parameter goes under as well as over a set threshold.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform cold weather clothing or in a Mission Oriented Protective Posture	D/TI
SSS473	The TCS shall provide the necessary processing, display, and control capabilities to ensure dynamic situational awareness input to the TCS operator.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture	D/T
SSS474	The TCS shall minimize alphanumeric data display in favor of graphic, pictorial information display	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform cold weather clothing or in a Mission Oriented Protective Posture	D/I
SSS475	The TCS HCI shall provide unambiguous AV and payload control and status feedback indicators to ensure safe, efficient operations of two AVs and their payloads by a single TCS station.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture	D/T
SSS476	The TCS shall provide for a specific icon shape on a constant contrast background, as well as other visual information coding mechanisms, to cue the TCS operator regarding which UAVs are under his or her primary control.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform cold weather clothing or in a Mission Oriented Protective Posture	D/T
SSS477	The TCS HCI shall provide the capability to select and amplify an object and point on a map as well as payload screen.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture	D

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS478	The TCS HCI shall provide coarse and fine payload control capabilities directly on the payload screen.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture	D
SSS479	The TCS HCI shall display the SAR imaging swath on the map display.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform cold weather clothing or in a Mission Oriented Protective Posture	D
SSS480	The TCS HCI shall provide the on-screen capability to select and efficiently move as well as reorient a previously defined SAR imaging swath.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform cold weather clothing or in a Mission Oriented Protective Posture	D/T
SSS481	The TCS HCI shall provide the capability to lock onto and hold a coordinate point on the payload imagery window.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform cold weather clothing or in a Mission Oriented Protective Posture	D
SSS482	The TCS HCI shall provide the capability to display operator definable "Lock Out" zones around waypoints, Launch and Recovery Point (LRP), as well as any selected point on the AV flight path.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture	D
SSS483	DELETED.		
SSS484	The TCS HCI shall provide for a rapid means to cancel aural warnings.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform cold weather clothing or in a Mission Oriented Protective Posture	D
SSS485	The TCS HCI shall provide for separation, grouping, and visual coding of multiple categories of alerts, to include Warnings, Cautions, and Advisories.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture	D
SSS486	The TCS HCI shall provide for visual Warnings, Cautions, and Advisories to be displayed at or near the center of the field of view, i.e., within a 30° cone, of all monitors in a TCS system.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture	D/T
SSS487	For AV safety as well as mission-critical Warnings, the TCS HCI shall provide a default selection as well as an override option, along with a selection of adaptive responses, and the minimum information necessary to assist the operator in responding quickly and adaptively to the emergency.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture	D/T

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS488	The TCS HCI shall provide for on-screen information to include, as a minimum, overlays, headers, cursors, alphanumeric annotation, waypoints, crosshairs, designed to be visible against the complete spectrum of map and payload video backgrounds.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture	D/T
SSS489	The TCS HCI shall provide continuously-available, on-screen control functions for time and mission-critical operations, to include as a minimum print, freeze, declassification, mark VCR, decutter, cease RF transmission.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture	D/T
SSS490	The TCS HCI shall provide for the capability to automatically overlay designated target locations from the payload screen onto the map screen.	ORD019 The TCS shall have ergonomically designed operator controls and displays. The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture	D
<i>3.14 Training Related Requirements</i>			
SSS491	TCS training and training support shall include the processes, procedures, techniques, training devices and equipment to train civilian, active duty and reserve military personnel to operate and support the TCS system.	ORD095 TCS unit training shall be conducted in both garrison and field environments -- individual and collective modes.	I
SSS492	The TCS system shall provide, for the operator and maintainer, an embedded or add-on interactive training courseware with self-paced instruction, duplicating UAV flight performance characteristics, capabilities, and limitations.	ORD096 The TCS system shall provide, for the operator and maintainer, the capability for incorporation of embedded / add-on interactive training with self-paced instruction, duplicating UAV flight performance characteristics, capabilities, and limitations.	D/I
SSS493	The Outrider TCS system shall be compatible with the U.S. Army Intelligence and Electronic Warfare Tactical Proficiency Trainer as an objective.	ORD097 The TUAV TCS system shall be compatible with the U.S. Army Intelligence and Electronic Warfare Tactical Proficiency Trainer (Multiple UAV Simulation Environment) as an objective.	D/I
SSS494	The interactive courseware training capability for TCS shall be developed during Phase I and introduced to the user during scheduled demonstrations and tests.	ORD096 The TCS system shall provide, for the operator and maintainer, the capability for incorporation of embedded / add-on interactive training with self-paced instruction, duplicating UAV flight performance characteristics, capabilities, and limitations.	D
SSS495	The training capability for performance of TCS functions shall include primary mission (flight route/payload) planning, mission control and monitoring, imagery processing, tactical communications, AV control communications and TCS system on line diagnostics.	ORD096 The TCS system shall provide, for the operator and maintainer, the capability for incorporation of embedded / add-on interactive training with self-paced instruction, duplicating UAV flight performance characteristics, capabilities, and limitations.	D/I
SSS496	The TCS shall provide the functional capability to train personnel in the operation of the TCS system, performance of TCS UAV functions, and on-line system troubleshooting.	ORD096 The TCS system shall provide, for the operator and maintainer, the capability for incorporation of embedded / add-on interactive training with self-paced instruction, duplicating UAV flight performance characteristics, capabilities, and limitations.	D/I

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS497	TCS system training shall include system architecture, component familiarization, and system startup, initialization, system recovery, on-line diagnostics, and shutdown.	ORD096 The TCS system shall provide, for the operator and maintainer, the capability for incorporation of embedded / add-on interactive training with self-paced instruction, duplicating UAV flight performance characteristics, capabilities, and limitations.	D/I
SSS498	DELETED.		
SSS499	The TCS system shall not be required to support Training operations concurrent with the execution of an actual mission.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSSS500	The capability for the conduct of actual communications processing concurrently with Training operations shall be provided if and only if messages are identified as training messages.	ORD016 The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	D
SSSS501	Training shall be adequate to maintain operator and maintainer skills and proficiencies.	ORD096 The TCS system shall provide, for the operator and maintainer, the capability for incorporation of embedded / add-on interactive training with self-paced instruction, duplicating UAV flight performance characteristics, capabilities, and limitations.	D/T
SSS502	TCS shall record operator and maintainer actions for self assessment and performance enhancement.	ORD096 The TCS system shall provide, for the operator and maintainer, the capability for incorporation of embedded / add-on interactive training with self-paced instruction, duplicating UAV flight performance characteristics, capabilities, and limitations.	D/T
SSSS503	Operator and maintainer performance shall be measurable using parameters retrievable from the TCS to determine proficiency levels.	ORD096 The TCS system shall provide, for the operator and maintainer, the capability for incorporation of embedded / add-on interactive training with self-paced instruction, duplicating UAV flight performance characteristics, capabilities, and limitations.	D/A/I
<i>3.15 Logistics-Related Requirements</i>			
SSSS504	Support for the TCS shall be in accordance with the Integrated Logistical Support Plan (ILSP) and the maintenance concepts and policies of the individual Services.	ORD085 Support for the TCS shall be in accordance with the Integrated Logistical Support Plan (ILSP) and the maintenance concepts and policies of the individual Services.	I
SSSS529	All TCS Operator Manuals and Technical Manuals shall be verified and validated prior to initial operational test.	ORD098 All TCS Operator Manuals and Technical Manuals shall be verified and validated prior to initial operational test.	I
SSSS505	TCS transport and storage containers shall be reusable and enable the operators to set-up equipment within the established timelines in their ORDs.	ORD108 TCS containers must be reusable and enable the operators to set-up equipment within the established timelines in their ORDs.	D/I
SSSS506	The TCS shall adhere to DOD regulations and policy governing military standards for logistics, POL, tools, Lubricants (POL), tools, Test, Measurement, and Diagnostic Equipment (TMDE), tools, and other support items.	ORD117 The TCS shall adhere to DOD regulations and policy governing military standards for logistics, POL, tools, Lubricants (POL), tools, Test, Measurement, and Diagnostic Equipment (TMDE), tools, and other support items.	I

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
SSS507	Standard tools, TMDE, repair parts, and lubricants shall be used to maintain the TCS. Exceptions shall be considered on a case by case basis.	ORD086 Standard tools, TMDE, repair parts, and lubricants shall be used to maintain the TCS.	I
SSS508	Each Service shall support the TCS as part of the UAV system which is organic to them.	ORD102 Each Service shall support the TCS as part of the UAV system which is organic to them.	A/I
SSS509	The TCS shall be maintained in accordance with the UAV ORD for that Service and the level of repair analysis for the hardware chosen.	ORD075 The TCS shall be maintained in accordance with the UAV ORD for that Service and the level of repair analysis for the hardware chosen.	D/I
SSS510	A TCS support and fielding package shall be developed and available for operational testing.	ORD083 A TCS support and fielding package shall be developed and available for operational testing.	
SSS511	The TCS shall be maintained in accordance with Services' approved UAV maintenance concepts and procedures.	ORD084 The TCS shall be maintained in accordance with Services' approved UAV maintenance concepts and procedures.	I
SSS512	To the maximum extent possible, general purpose test equipment (GPTE) and common tools resident in each service shall be used to perform all corrective and preventative maintenance at all authorized levels of maintenance.	ORD087 To the maximum extent possible, general purpose test equipment (GPTE) and common tools resident in each service shall be used to perform all corrective and preventative maintenance at all authorized levels of maintenance.	I
SSS513	Tools and test equipment required to maintain the TCS but not resident in each service inventory shall be identified as special tools and special purpose test equipment (SPTE), respectively, and kept to a minimum.	ORD087 To the maximum extent possible, general purpose test equipment (GPTE) and common tools resident in each service shall be used to perform all corrective and preventative maintenance at all authorized levels of maintenance.	I
SSS514	The environmental support required by the TCS shall be the same as that required for the respective UAV System.	ORD119 The environmental support required by the TCS shall be the same as that required for the respective UAV System.	A/I
SSS515	Basing for the system shall follow the plan for UAV units and service command echelon requirements as delineated in the ORD.	ORD115 Basing for the system will follow the plan for UAV units and service command echelon requirements as delineated in paragraph 6 below.	I
	3.15.1 Transportability		
SSS516	The TCS shall meet the deployment criteria for the organic unit to which it is assigned.	ORD076 The TCS shall meet the deployment criteria for the organic unit to which it is assigned.	I
SSS517	The TCS shall be transported into the theater as an organic component of the operational UAV system being deployed.	ORD111 The TCS shall be transported into the theater as an organic component of the operational UAV system being deployed.	I
SSS518	TCS transportation in theater for Army and Marine Corps systems shall be by ground transport, air, or rail.	ORD112 TCS transportation in theater for Army and Marine Corps	I
SSS519	For the Air Force, TCS transportation to the theater shall be by air.	ORD113 For the Air Force, TCS transportation to the theater shall be by air.	I
SSS520	Within the theater, the USAF GCS shall be capable of being moved around an established air field.	ORD114 Within the theater, the USAF GCS shall be capable of being moved around an established air field.	I

SSS NUMBER	SSS REQUIREMENT	ORD REQUIREMENT AND NUMBER	TEST METHOD
	3.15.1 Ground		
SSSS521	The TCS shall be ground transportable.	ORD112 TCS transportation in theater for Army and Marine Corps systems shall be by ground transport, air, or rail.	D
	3.15.1.2 Air		
SSSS522	The TCS shall be air transportable by helicopter (CH-47/CH-53D) and C-130 drive-on/drive-off capable.	ORD076 The TCS shall meet the deployment criteria for the organic unit to which it is assigned.	D
	3.15.1.3 Sea		
SSSS523	The TCS shall be sea transportable.	ORD076 The TCS shall meet the deployment criteria for the organic unit to which it is assigned.	D
	3.15.1.4 Rail		
SSSS524	The TCS shall be rail transportable.	ORD112 TCS transportation in theater for Army and Marine Corps systems shall be by ground transport, air, or rail.	D
	3.15.1.5 Preparation Time		
SSSS525	The TCS shall be configurable for sea, ground, or air transport in 2 hours or less.	ORD076 The TCS shall meet the deployment criteria for the organic unit to which it is assigned.	D/T
SSSS526	The TCS system shall be capable of being de-configured from sea ground/air transport and ground-mobile in 2 hours or less.	ORD076 The TCS shall meet the deployment criteria for the organic unit to which it is assigned.	D/T
	3.16 Other Requirements		
SSSS530	DELETED.		
SSSS531	The TCS shall have the capability to be integrated and operated from tactical and command and control aircraft.	ORD081 The TCS shall have an objective capability to be integrated and operated from tactical and command and control aircraft and submarines.	D
SSSS532	The TCS shall have the capability to be integrated and operated from submarines.	ORD081 The TCS shall have an objective capability to be integrated and operated from tactical and command and control aircraft and submarines.	D
SSSS533	The TCS shall have the capability to be integrated and operated from land based platforms.	ORD081 The TCS shall have an objective capability to be integrated and operated from tactical and command and control aircraft and submarines.	D
SSSS534	The TCS shall have the capability to be integrated and operated from ships.	ORD081 The TCS shall have an objective capability to be integrated and operated from tactical and command and control aircraft and submarines.	D

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APPENDIX B: Requirements Cross-Reference
TCS ORD TO TCS SSS REQUIREMENT CROSS-REFERENCE MATRIX

ORD NUMBER	ORD REQUIREMENT	SSS REQUIREMENT AND NUMBER
ORD001	The TCS shall have the capability to be configured and down-scaled to meet the user's deployability or operator limitations.	SSS440 TCS hardware flexibility and expansion shall be provided through use of GFE, NDI and COTS hardware designed to be upgraded and expanded.
ORD002	The TCS software shall provide a high resolution, computer generated, graphics user interface that enables the UAV operator that is trained on one system to control different types of UAVs or UAV payloads with minimal additional training.	SSS404 The TCS software shall provide a high resolution, computer generated, graphical user interface that enables the UAV operator that is trained on one system to control different types of UAVs or UAV payloads with minimal additional training.
ORD003	The TCS software shall have an open architecture and be capable of being hosted on computers that are typically supported by the using Service.	SSS398 The TCS software shall be capable of being hosted on a variety of computer operating systems that are organic to the various Services.
		SSS419 The selection of processors, interface cards for communication interfaces, disk drives, video, networking equipment, and all other hardware for use in the TCS shall be made according to standards for production of an open architecture.
		SSS420 The selection of operating system and programming language for use in the TCS shall be made according to standards for development of an open architecture.
		SSS438 Software written for other systems shall be used in TCS where it is determined that the existing software is suitable for use within the TCS software.
ORD004	The TCS software shall be Defense Information Infrastructure/Common Operating Environment compliant.	SSS417 TCS software flexibility and expandability shall be provided through use of the DII COE and through use of standardized software development practices.
ORD005	The TCS software shall be non-proprietary.	SSS400 The TCS software shall be non-proprietary.
ORD006	For the U.S. Army and the U.S. Marine Corps, the TCS shall be an integral part of the TUAV two HMMWV-based GCSSs.	

ORD NUMBER	ORD REQUIREMENT	SSS REQUIREMENT AND NUMBER
ORD007	The TCS hardware shall allow for long range communications from one TCS to another.	SSS375 The TCS hardware shall allow for long range communications from one TCS to another.
ORD008	The TCS hardware shall allow for data storage expansion.	SSS376 The TCS hardware shall allow for data storage expansion.
ORD009	The TCS hardware shall allow for access to other computers to share in processing capability.	SSS377 The TCS hardware shall allow access to other computers to share in processing capability.
ORD010	The TCS hardware shall allow for multiple external peripherals.	SSS378 The TCS hardware shall allow for multiple external peripherals.
ORD011	The TCS shall support 5 levels of UAV interaction: 1. Level one is the receipt and transmission of secondary imagery and/or data 2. Level two is the direct receipt of imagery and/or data 3. Level three is the control of the UAV payload in addition to direct receipt of imagery/data 4. Level four is control of the UAV, less launch and recovery, plus all the functions of level three 5. Level five is the capability to have full function and control of the UAV from takeoff to landing	SSS409 The TCS data latency shall not be greater than that present in the Predator ground control station or Outrider ground control station, whichever is smaller. SSS329 Remotely hosted applications shall communicate in a client server relationship via the defined data server interface. SSS328 The Data Server interface shall support distributed processing capability. SSS327 This interface shall allow the information from the data server to be made available to other components of the TCS. SSS326 The TCS shall provide an internal interface for establishing communications with the data server within TCS. SSS175 The TCS shall be capable of automatically controlling the transmitter and receiver frequencies of the selected data terminal. SSS173 The TCS shall be capable of automatically controlling the transmitter and receiver modes of the selected data terminal. SSS172 The operator shall be able to manually override the automatic function selection if desired.

ORD NUMBER	ORD REQUIREMENT	SSS REQUIREMENT AND NUMBER
		SSS171 The TCS shall be capable of automatically controlling the transmitter and receiver functions of the selected data terminal.
		SSS170 The TCS shall be capable of properly selecting and positioning antennas to maintain line-of-sight or satellite communication.
		SSS167 The TCS shall provide automatic pointing commands for directional antennas.
		SSS557
		The TCS shall incorporate antenna pedestal 3 -axis stabilization to compensate for platform (e.g. ship, or HMMWV) motion, if applicable.
		SSS165 The TCS shall provide an interactive display for the purpose of controlling the data link terminal.
		SSS164 The TCS shall support a sequential LOS data link and beyond LOS data link capability.
		SSS162 As a minimum the TCS LOS data terminal control modes shall include acquisition, autotrack, search, manual point, omni directional, or directional modes of operation.
		SSS161 The TCS shall be capable of automatically selecting the proper mode of operation for the selected data terminal.
		SSS160 Data terminal control shall include, but is not limited to, antenna pointing control, transmitter control, and receiver control.
		SSS159 The TCS shall be capable of interfacing with the specified data terminal and issuing data link terminal commands required to establish, control, and maintain the data link with a selected AV.
		SSS158

ORD NUMBER	ORD REQUIREMENT	SSS REQUIREMENT AND NUMBER
		The TCS will have the capability to control and monitor a line-of-sight or satellite data terminal.
SSS155	TCS shall provide the capability to monitor payload adherence to the uplinked mission plan and to monitor the payload status.	
SSS154	The TCS shall provide override of payload automated or preprogrammed inputs.	
SSS153	The TCS shall provide a display for the purpose of controlling the payload.	
SSS152	The TCS shall permit the operator to automatically control of the payload using the methods supported by the AV payload being controlled. Table 3.2.2.1-1 defines the payload control methods to be supported for the candidate AVs. Table 3.2.2.1-1 Payload Control Methods	
PAYOUT TYPE EO/IR	CONTROL METHOD Point to Coordinate Hold on Coordinates Auto-Track Auto-Search	
SAR Future		
SSS151	The TCS shall receive, process, and present payload data to the operator so that the status of the payload can be determined.	
SSS147	The TCS shall have the capability to control and monitor the AV payload(s).	
SSS129	The operator shall have the capability to initiate or change flight behaviors by sending the proper control commands to the UAV, and shall have the capability to manually override these behaviors at anytime.	
SSS128	The TCS shall allow the operator to control the flight behavior characteristics inherent to the selected AV. Table 3.2.2.1.1-1 shows the expected flight behavior characteristics for known	

ORD NUMBER	ORD REQUIREMENT	SSS REQUIREMENT AND NUMBER
		<p>and future UAVs.</p> <p>Table 3.2.2.1.1-1 UAV Flight Behavior Characteristics</p> <p>FLIGHT BEHAVIOR CHARACTERISTICS</p> <p>UAV Predator</p> <p>Airspeed</p> <p>Altitude</p> <p>Weight</p> <p>Time on Station</p> <p>Fuel Load</p> <p>Heading</p> <p>Outrider</p> <p>Airspeed</p> <p>Altitude</p> <p>Weight</p> <p>Time on Station</p> <p>Fuel Load</p> <p>Future</p> <p>.</p> <p>SSS127 The TCS shall provide interactive displays necessary to command the flight of an AV.</p> <p>SSS539 The TCS shall provide the capability to implement an emergency action plan, if supported by the AV, to control the AV during equipment failures.</p> <p>SSS126 The TCS shall only support operation of the AV via autopilot flight modes, and shall not provide the operator the capability to directly manipulate AV flight surfaces.</p> <p>SSS122 The TCS shall provide the capability to enter AV preset limits, which as a minimum will include airspeed limits, altitude limits, and fuel limits.</p> <p>SSS120 The TCS shall provide the capability to control the flight of the selected AV in accordance with the specific AV's operational performance capabilities.</p> <p>SSS010 The TCS shall support 5 levels of UAV interaction: Level 1: receipt and transmission of secondary imagery and/or data Level 2: direct receipt of imagery and/or data Level 3: control of the UAV payload in addition to direct receipt of imagery/data</p>

ORD NUMBER	ORD REQUIREMENT	SSS REQUIREMENT AND NUMBER
		Level 4: control of the UAV, less launch and recovery, plus all the functions of level three
		Level 5: capability to have full function and control of the UAV from takeoff to landing
SSS130		The TCS shall have the capability to command the AV to use the navigation methods inherent to the selected AV. Table 3.2.2.1.2-1 shows the expected navigation methods for known and future UAVs.
		Table 3.2.2.1.2-1 UAV Navigation Methods
	NAVIGATION METHOD	UAV
	Inertial Navigation System (INS)	Predator
	Global Positioning System (GPS)	Predator
	GPS	Outrider
	Integrated INS/GPS	Future
SSS131		The operator shall have the capability to initiate or change UAV navigation methods by sending the proper control commands to the UAV, and shall have the capability to manually override these methods at any time.
SSS132		The TCS shall provide the functionality to control the operation of the Air Data Terminal (ADT). This control will include control of the ADT antenna and of the ADT transmitter and receiver.
SSS133		The TCS shall provide the functionality to control the ADT antenna, including its pointing direction and mode of transmission.
SSS134		The TCS shall provide the functionality to control the frequencies used by ADT for data link communication.
SSS139		The TCS shall allow the operator to initiate the emergency recovery feature of the AV, if the AV has an emergency recovery feature.
SSS140		TCS shall provide the capability to monitor specific telemetry elements real-time, and record all or selected telemetry elements for future review or processing.
SSS141		TCS shall provide the capability to monitor AV adherence to the uplinked mission plan.

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		detecting any deviations greater than 10%, and notifying the operator if deviations are detected.
		SSS142 TCS shall provide the capability to monitor the status of all AV subsystems reporting status.
		SSS287 The TCS shall provide the system functionality necessary to interface with the data terminal.
		SSS321 The TCS shall have an interface to a source of current navigation information. As a minimum this information will include the location of all data terminals, launch and recovery sites, and the controlling TCS.
		SSS168 The TCS shall allow for the manual pointing of directional antennas when desired by the operator.
ORD012	The TCS shall provide full interoperability between the Services and their UAV systems with varying levels of UAV interaction.	SSS009 The TCS system shall provide software capabilities and hardware configurations necessary to fulfill the operational tasking requirements across the 5 levels of interaction.
ORD013	The TCS core software shall be generically written to provide Level Five interaction for both TUAV and MAE UAVs and establish the architecture for future tactical UAVs.	SSS396 The TCS core software shall be generically written to provide level one through level five interaction for both Outrider and Predator UAVs and establish the architecture for future tactical UAVs.
		SSS437 Newly designed software shall be developed in accordance with a tailored MIL-STD-498.
ORD014	The TCS software and hardware shall be developed so that it is scaleable to meet the users' needs.	SSS004 The TCS shall consist of the TCS workstation Hardware Configuration Items (HWClIs), TCS Software Compute Software Configuration Items (CSClIs), and additional TCS Support HWClIs and CSClIs. .
ORD015	The TCS shall prevent users from entering levels of interaction for which they are not authorized by software and/or hardware configuration.	SSS403 The TCS software shall restrict the operator(s) from exercising levels of interaction not achievable by the system.
		SSS023 The TCS shall inform the operator if the operator attempts to execute a function that is prohibited based upon the determined level of interaction.
		SSS022 Levels of interaction higher than that achievable by a particular TCS configuration shall be prohibited.

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ORD016	The TCS shall enable the UAV operator to communicate, receive mission tasking, conduct mission planning, execute the mission, and collect, process, and disseminate data for the TUAV and MAE UAV, and support data collection from HAE UAV.	<p>SSS021 During startup, the TCS shall determine which of the 5 levels of interaction are achievable by the TCS configuration being used.</p> <p>SSS500 The capability for the conduct of actual communications processing concurrently with Training operations shall be provided if and only if messages are identified as training messages.</p> <p>SSS047 Shutdown of the TCS shall include proper termination of all active interfaces.</p> <p>SSS046 Shutdown of the TCS shall include shutdown of HCIs.</p> <p>SSS045 Shutdown of the TCS shall include shutdown of appropriate functions.</p> <p>SSS028 Initialization of the TCS shall include establishment of the state of readiness of all interfaces.</p> <p>SSS027 Initialization of the TCS shall include start of HCIs.</p> <p>SSS026 Initialization of the TCS shall include download of software.</p> <p>SSS542 Initialization of the TCS HWCLs shall include startup of HWCLs.</p> <p>SSS335 The TCS shall be able to route VCR recorded payload video to the C4I Interfaces.</p> <p>SSS332 The intercom system shall be compatible with service specific voice communication systems.</p> <p>SSS331 The TCS shall incorporate an intercom system that allows the operator(s) of the TCS to verbally communicate with each other.</p> <p>SSS210 The TCS shall have the functionality necessary to manage all aspects of C4I system interfaces to</p>

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		include receiving, processing, and transmitting tactical information to include but not limited to character based text messages, NTIF 2.0 imagery files, and RS-170A video.
SSS208	The TCS shall have the functionality to develop an estimate of the error in computed target coordinates, and associate the error estimate with the appropriate target.	
SSS189	Payload telemetry data shall be available to support other TCS functions as required.	
SSS180	The TCS shall be capable of presenting to the operator a visual depiction of the minimum and maximum data link operational ranges.	
SSS121	The Operator shall be able to fully control the AV's Identification Friend or Foe (IFF).	
SSS119	AV telemetry data shall be available to support other TCS functions as required.	
SSS118	TCS flight controls shall provide Operator Command and Autonomous Control with operator override.	
SSS020	When the TCS software is halted due to an unplanned power interruption or abnormal program termination, then the TCS shall enter the Recovery Startup Mode upon application of power.	
SSS019	When the TCS Software is terminated normally the TCS shall enter the Normal Startup Mode of operation upon application of power.	
SSS017	The Startup State shall be comprised of the following modes: Normal Startup Mode, and Recovery Startup Mode.	
SSS080	The TCS shall allow the operator to define the desired AV route in waypoint format, with the capability to include a minimum of 500 waypoints in each flight route plan.	
SSS551	The TCS shall allow the operator to define the desired AV route in waypoint format	

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		<p>SSS079 The Flight Route Plan, as a minimum, shall include AV flight path information, payload tasking information, Loss of Link plan, AV VCR control tasking, and data link control information.</p>
		<p>SSS050 The TCS shall have the functionality to allow the operator to generate a UAV mission plan.</p>
		<p>SSS043 Upon the selection of a shutdown command the TCS shall enter the Shutdown State, which will cause the TCS to be placed in a condition where power can be removed without impacting operations or causing damage to the system, and from which restart of the system can be accomplished normally.</p>
		<p>SSS037 In the Normal Operations Mode the TCS will support the following functions:</p> <ol style="list-style-type: none"> 1. Mission Planning 2. Mission Control and Monitoring 3. Payload Product Management 4. Target Coordinate Development 5. C4I Systems Interface
		<p>SSS112 The TCS shall have the capability to sequentially control and monitor multiple AVs.</p>
		<p>SSS032 When in the Operations State the TCS shall be capable of operating in three modes, normal operations mode, training operations mode, and maintenance operations mode.</p>
		<p>SSS014 The states of operation of the TCS shall include Startup, Operation, and Shutdown.</p>
		<p>SSS016 Upon application of power the TCS shall enter the Startup State.</p>
		<p>SSS234 All digital messages received by the TCS shall be error checked automatically and corrected when possible.</p>
		<p>SSS235 All erroneous messages that cannot be corrected by TCS shall be flagged to the operator.</p>

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		SSS177 The TCS shall receive, process, and present status data to the operator so that the status of the data terminal and the supported AV data link can be monitored.
		SSS178 The TCS shall be capable of monitoring the signal strength of the received and transmitted signals for the selected data terminal.
		SSS179 The TCS shall be capable of monitoring the signal quality of the received and transmitted signals for the selected data terminal.
		SSS029 The TCS in the Recovery Startup Mode shall provide the system functionality to resume the Operations State within TBD seconds.
		SSS030 For recovery from abnormal termination periods of less than a programmable time (T1), the TCS shall resume the previous Operations State in the functions and using data that was executing prior to the abnormal termination.
		SSS031 For recovery from abnormal termination periods of greater than time T1, TCS shall prompt the operator to select the type of recovery to be executed: (1) Resume In The Same Modes And Data; (2) Resume in the Same Modes but Review and Modify the Command Data as Necessary; or (3) Perform a Command Shutdown and Startup Via the Normal Startup Mode.
		SSS033 The Operations State modes shall not exist concurrently.
		SSS035 The operator shall have the capability to command the system to the shutdown state from all modes under the Operations State.
		SSS015 The TCS states shall not exist concurrently.
		SSS052 The TCS shall facilitate automated processing of mission plan data received via C4I interfaces in order to extract the appropriate mission planning data.
		SSS057

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		A Mission Plan shall include a validated Flight Route Plan for a selected AV, and an External Communications Plan. A Flight Route Plan is defined in Section 3.2.1.1. An External Communications Plan is Defined in Section 3.2.1.3.
SSS068	The TCS shall allow the operator to enter or review mission plan parameters, including AV flight parameters, payload control parameters, data link control parameters, AV VCR control parameters, and AV loiter patterns.	
SSS069	The TCS shall provide the capability to enter system configuration characteristics in the mission plan, to include selected AV type, AV identification number, selected payload type, ground control authorization information, and required communications pre-set for data links, tactical communications, and C4I data dissemination.	
SSS071	TCS shall provide the capability for the operator to retrieve a mission plan for viewing, modification, or deletion at the operator's discretion.	
SSS073	The TCS shall automatically check the validity of the intended mission plan prior to its implementation including altitude constraints, data link range constraints, airspace restrictions, fuel limitations, threat constraints, terrain masking effects, and Loss of Link (LOL) Plan.	
SSS074	The TCS shall notify the operator of all discrepancies found during the mission plan check or indicate successful completion of the mission plan check.	
SSS075	The TCS shall allow the operator to set the LOL delay timer(s) during mission planning. The LOL delay is the time from when the AV detects an unplanned LOL to the time it initiates LOL procedures.	
SSS553	The TCS shall provide the capability to print waypoint data in alphanumeric format.	
SSS076	The TCS shall compute the AV's flight range with remaining fuel.	
SSS082	The TCS shall provide the capability to enter, display, and print waypoint data in alphanumeric format.	

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		<p>SSS090 The algorithmic accuracy of all flight planning calculations shall be established via comparison with an ideal mission flown by a 6 degree-of-freedom air vehicle simulator.</p> <p>SSS091 The flight route plan, as a minimum, shall provide the necessary AV commands to autonomously execute a programmed flight, manipulate the payload, and return to a designated recovery area.</p> <p>SSS093 The TCS shall provide the capability to create waypoints that define the desired flight path, define AV Altitude and Airspeed associated with the waypoint, and define payload commands associated with the waypoints.</p> <p>SSS095 The TCS shall be capable of loading, zooming, scrolling and clearing a map on the map display.</p> <p>SSS096 Upon operator request, the following icons shall be displayed on the map display (when the coordinates reside on the displayed portion of the map). <ol style="list-style-type: none"> Display an icon indicating AV position when receiving downlink from the desired AV. </p> <p>SSS102 The TCS shall be capable of displaying the positions of the icons in Lat/Lon., Universal Transverse Mercator (UTM), and Military Grid Reference System (MGRS) formats.</p> <p>SSS103 The TCS shall be able to generate payload planning information that will be incorporated into the flight route plan for uplink to the AV.</p> <p>SSS104 The TCS shall provide the system functionality necessary to generate a payload plan that, as a minimum, shall include the following information: <ol style="list-style-type: none"> Payload type Payload commands Payload mode settings Payload pointing commands, either manual or automated Payload field of view settings, either manual or automated </p> <p>SSS105</p>

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		The TCS shall have the capability to generate a communications plan as part of a UAV Mission Plan.
SSS107	An external communications plan shall include information necessary to co-ordinate UAV operations with the current battlespace management as defined by the Air Tasking Order (ATO).	
SSS108	The Predator and Outrider operational functionality shall not be required to exist concurrently within the mission monitoring and control capability.	
SSS109	AV specific components used to perform ground based closed loop command and control functions for TCS shall be initialized upon operator selection of a specific AV.	
SSS113	TCS shall notify the operator when AV performance parameters are out of limits.	
SSS218	The TCS shall export and disseminate formatted digital imagery.	
SSS230	The TCS shall have the functionality to provide the following digital data processing capability:	
	1. Create Tactical Communications Messages For Transmission	
SSS236	The TCS shall provide the capability to log all incoming and outgoing formatted tactical messages.	
SSS237	The TCS shall have the functionality to provide the following analog data processing capability:	
	1. Prepare annotated or unannotated analog imagery for transmission	
SSS246	TCS shall be capable of executing payload maintenance software and displaying appropriate status results.	
SSS247	TCS shall be capable of executing data terminal maintenance software and displaying appropriate status results.	
SSS248		

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		TCS shall be capable of executing workstation and peripheral equipment maintenance software and displaying appropriate status results.
SSS251	The TCS shall allow the operator to control and monitor the AV's FD/L.	
SSS254	Startup FD/L in the TCS shall fault detect TBD% of all mission critical failures with a false alarm rate not to exceed TBD%.	
SSS255	Startup FD/L shall isolate TBD% of all detected mission critical failures to a single LRU.	
SSS256	The remaining mission critical failures detected but not isolated by Startup FD/L shall be isolated using manual isolation procedures and technical data provided to the operator by the TCS.	
SSS257	Likewise, Startup FD/L in the TCS shall fault detect TBD% of all non-mission critical failures with a false alarm rate not to exceed TBD%.	
SSS258	Startup FD/L shall isolate TBD% of all detected non-mission critical failures to a single LRU.	
SSS259	The remaining non-mission critical failures detected but not isolated by Startup FD/L shall be isolated using manual isolation procedures and technical data provided to the Operator(s) by the TCS.	
SSS260	Periodic FD/L in the TCS shall fault detect TBD% of all mission critical failures with a false alarm rate not to exceed TBD%.	
SSS261	Periodic FD/L shall isolate TBD% of all detected mission critical failures to a single LRU.	
SSS262	The remaining mission critical failures detected but not isolated by Periodic FD/L shall be isolated using manual isolation procedures and technical data provided to the operator by the TCS.	

ORD NUMBER	ORD REQUIREMENT	SSS REQUIREMENT AND NUMBER
		SSS263 Periodic FD/L in the TCS shall fault detect TBD% of all non-mission critical failures with a false alarm rate not to exceed TBD%.
SSS265	The remaining non-mission critical failures detected but not isolated by Periodic FD/L shall be isolated using manual isolation procedures and technical data provided to the Operator(s) by the TCS.	
SSS266	Periodic FD/L shall never take longer than TBD minutes to execute.	
SSS268	Extensive FD/L in the TCS shall fault detect TBD% of all mission critical failures with a false alarm rate not to exceed TBD%.	
SSS275	Extensive FD/L shall inform the Operator(s) how long a specific test will take and periodically, at least once every TBD seconds, delineate the estimated time till completion.	
SSS274	Extensive FD/L shall allow the Operator(s) to select specific tests or all test for execution.	
SSS273	The remaining non-mission critical failures detected but not isolated by Extensive FD/L shall be isolated using manual isolation procedures and technical data provided to the Operator(s) by the TCS.	
SSS272	Extensive FD/L shall isolate TBD% of all detected non-mission critical failures to a single LRU.	
SSS271	Likewise, Extensive FD/L in the TCS shall fault detect TBD% of all non-mission critical failures with a false alarm rate not to exceed TBD%.	
SSS270	The remaining mission critical failures detected but not isolated by Extensive FD/L shall be isolated using manual isolation procedures and technical data provided to the operator by the TCS.	
		SSS269

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		Extensive FDL shall isolate TBD% of all detected mission critical failures to a single LRU.
SSS276	The TCS shall allow Authorized Operators to install software upgrades via CD-ROM or other media storage devices.	
SSS278	The TCS shall provide the capability for Authorized Operators to modify all TCS programmable parameters.	
SSS282	The TCS shall allow an Authorized Operator to execute a software debug capability and view the resulting debug diagnostic information.	
SSS038	Functions under the normal operations mode shall operate concurrently without precluding or excluding any of the other functions, in accordance with allowable operations as determined by the appropriate levels of interaction.	
SSS039	In the Training Operations Mode the TCS shall support the following functions:	
	1. Mission Planning 2. Mission Control and Monitoring 3. Payload Product Management 4. Target Coordinate Development 5. C4I Systems Interface	
SSS040	Functions under the training operations mode shall operate concurrently without precluding or excluding any of the other functions, in accordance with allowable operations as determined by the appropriate levels of interaction.	
SSS041	In the Maintenance Operations Mode the TCS shall support the following functions:	
	1. Conduct AV maintenance 2. Conduct payload maintenance 3. Conduct Data Link Terminal maintenance 4. Conduct workstation and peripheral equipment maintenance 5. Perform Fault Detection/Location (FDL) Logic 6. Perform Software Upgrades 7. Perform Software Debug and Monitoring	

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		Functions under the maintenance operations mode shall not operate concurrently.
SSS042		
SSS044	Shutdown of the TCS shall include storage of mission data files.	
SSS048	There shall be no modes of operation in the shutdown state.	
SSS245	TCS shall be capable of executing AV maintenance software and displaying appropriate status results.	
SSS397	The TCS software shall provide the UAV operator with the necessary tools for computer related communications, mission tasking, mission planning, mission execution, data receipt, data processing, and data dissemination.	
SSS401	The TCS's operating system and executable software shall be re-programmable without hardware disassembly.	
SSS405	Each control console shall have the following four display windows. A display to provide aircraft position, TCS position, flight path, and a waypoint graphics in the foreground which are positioned in relation to a map displayed in the background. A display to provide aircraft flight data or payload data in the foreground, and downlinked video in the background. A display to provide graphic presentations of downlinked telemetry data, and a display to present the interface menus for workstation software.	
SSS412	The Design features shall be included to safely:	
	1. minimize the number and frequency of required preventive maintenance actions based on performance requirements and lowest life cycle costs;	
	2. minimize the contribution to degradation of TCS equipment reliability as a consequence of performing either preventive or corrective maintenance;	
	3. enable the performance of all maintenance actions with safety and comparative ease by providing adequate access to all equipment components and minimizing the requirements for special tools and test equipment;	
	4. minimize the requirement for specially trained maintenance personnel;	
	5. improve system availability by the effective selection and incorporation of Built In Test Equipment (BITE);	

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		6. allow removal and replacement of replaceable units without soldering or unsoldering.
SSS421	Testability shall be considered in the design and development of the TCS.	
SSS422	The system shall be functionally and physically partitioned to allow for efficient fault isolation.	
SSS423	Control over internal items and devices shall be provided for detecting and isolating internal faults.	
SSS424	Test points and data paths shall be defined to support the testing strategy.	
SSS426	In the selection of hardware design solutions to satisfy the requirements herein, Non-Developmental Items (NDI) (off-the-shelf equipment previously approved for service use) will be chosen to the maximum extent practicable. If NDI that provides the desired functions can not be identified, then Commercial-Off-The-Shelf (COTS) hardware may be used.	
SSS427	System documentation shall be developed as part of the TCS program and will follow MIL-STD-498 for format.	
SSS428	The documentation developed shall contain sufficient level of detail to identify the functional, operational and design requirements of the TCS.	
SSS429	The documentation shall contain sufficient technical detail to define the hardware and software design implemented to satisfy the system requirements.	
SSS430	The TCS documentation shall include: [SSS376] 1) The TCS System/Subsystem Specification (SSS) 2) The TCS System/Subsystem Design Document (SSDD) 3) The TCS Software Requirements Specification (SRS) (1 for each CSCI) 4) Interface Requirement Specifications (IRS) for all interfaces 5) The Software Design Document (SDD) (1 for each CSCI) 6) The TCS Hardware Design Document (HDD) 7) Interface Design Document (IDD) for all interfaces	

ORD NUMBER	ORD REQUIREMENT	SSS REQUIREMENT AND NUMBER
ORD NUMBER	ORD REQUIREMENT	SSS Version Description Document(s) (VDD)
8)	TCS	TCS Version Description Document(s) (VDD)
SSS431	TCS material factors shall be governed by the NDI, GFE or COTS specifications.	
SSS432	During Phase 1, control techniques to minimize electromagnetic interference, emanation, and susceptibility shall be incorporated into the design of TCS equipment. This control will be inherent in the design of the TCS and the electrical and electronic equipment components and assemblies thereof.	
SSS434	There shall be neither unacceptable response nor malfunction of any TCS or equipment due to EMI produced by any or all of the TCS and equipment associated with the TCS.	
SSS441	After emplacement at the operational site, the TCS shall be capable of planning and launching a mission within 1 hour of tasking. Required activities include 1) mission planning of a minimum 1 waypoint mission, 2) preparing 2 AVs for flight, 3) data terminal setup, 4) safety equipment emplaced, 5) and a single AV launched.	
SSS442	The TCS shall be capable of operating continuously for a minimum of 72 hours.	
SSS499	The TCS system shall not be required to support Training operations concurrent with the execution of an actual mission.	
SSS072	TCS shall allow the operator to save the mission plan under a different name, for future retrieval.	
SSS097	Upon operator request, the following icons shall be displayed on the map display (when the coordinates reside on the displayed portion of the map).	
2.	Display an icon indicating payload center field of view and footprint when receiving downlink from the desired AV.	
3.	Display an icon indicating target position and type at coordinates selected by the operator.	
SSS098	Upon operator request, the following icons shall be displayed on the map display (when the coordinates reside on the displayed portion of the map).	
3.	Display an icon indicating target position and type at coordinates selected by the operator.	

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		<p>SSS099 Upon operator request, the following icons shall be displayed on the map display (when the coordinates reside on the displayed portion of the map).</p> <p>4. Display icons indicating TCS position and Ground Data Terminal (GDT) position.</p>
		<p>SSS100 Upon operator request, the following icons shall be displayed on the map display (when the coordinates reside on the displayed portion of the map).</p> <p>5. Display an icon indicating Launch & Recovery site.</p>
		<p>SSS101 Upon operator request, the following icons shall be displayed on the map display (when the coordinates reside on the displayed portion of the map).</p> <p>6. Display icons indicating Flight Plan waypoints.</p>
		<p>SSS194 This functionality, as a minimum, shall include: processing digital imagery for export and dissemination.</p>
		<p>SSS558 The TCS shall export and disseminate formatted NITF 2.0 files</p>
		<p>SSS220 The TCS shall export and disseminate tactical communication messages.</p>
		<p>SSS231 The TCS shall have the functionality to provide the following digital data processing capability:</p> <p>2. Review Incoming Tactical Communication Messages</p>
		<p>SSS232 The TCS shall have the functionality to provide the following digital data processing capability:</p> <p>3. Prepare Annotated Or Unannotated Digital Imagery For Transmission</p>
		<p>SSS233 The TCS shall have the functionality to provide the following digital data processing capability:</p> <p>4. Review Incoming Annotated Or Unannotated Digital Imagery</p>
		<p>SSS238 The TCS shall have the functionality to provide the following analog data processing capability:</p> <p>2. Receive incoming annotated or unannotated analog imagery</p>

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		SSS252 The TCS shall allow the operator to control and monitor the Payload's FDL.
SSS253		The TCS shall allow the operator to control and monitor the Data Link FDL.
SSS264		Periodic FDL shall isolate TBD% of all detected non-mission critical failures to a single LRU.
SSS267		Periodic FDL shall continuously operate in the background while the system is in the Operations state.
SSS277		The TCS shall restrict Operator access to this capability via password protection.
SSS279		The TCS shall restrict Operator access to this capability via password protection.
SSS283		The TCS shall restrict Operator access to this capability via password protection.
SSS543		Recovery of the TCS HWClIs shall include startup of HWClIs
SSS544		Recovery of the TCS HWClIs shall include download of software
SSS545		Recovery of the TCS HWClIs shall include startup of CSClIs
SSS546		Recovery of the TCS HWClIs shall include establishment of the state of readiness of all interfaces.
ORD017	The TCS shall provide an open software architecture that can support future UAVs.	SSS395 The TCS shall provide an open software architecture to be capable of supporting additional CSClIs, CSCs, and CSUs for future AVs, future payloads, and payload capabilities (e.g. auto-search and automatic target tracking), and future Tactical UAVs.
ORD018	The TCS shall have software based on Defense Information Infrastructure/Common Operating Environment per Assistant Secretary of Defense for Command, Control, Communications, and Intelligence (ASD(C3I)) Joint Technical Architecture (JTA).	SSS393 The TCS shall have software based on Defense Information Infrastructure/Common Operating Environment per Assistant Secretary of Defense for Command, Control, Communications, and Intelligence (ASD(C3I)) Joint Technical Architecture (JTA).

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ORD019	The TCS shall have ergonomically designed operator controls and displays.	<p>Intelligence (ASD/C3I) Joint Technical Architecture (JTA).</p> <p>SSS490 The TCS HCI shall provide for the capability to automatically overlay designated target transmissions from the payload screen onto the map screen.</p> <p>SSS489 The TCS HCI shall provide continuously-available, on-screen control functions for time and mission-critical operations, to include as a minimum print, freeze, declassification, mark VCR, declutter, cease RF transmission.</p> <p>SSS488 The TCS HCI shall provide for on-screen information to include, as a minimum, overlays, headers, cursors, alphanumeric annotation, waypoints, crosshairs, designed to be visible against the complete spectrum of map and payload video backgrounds.</p> <p>SSS487 For AV safety or mission-critical Warnings, the TCS HCI shall provide a default selection as well as an override option, along with a selection of adaptive responses, and the minimum information necessary to assist the operator in responding quickly and adaptively to the emergency.</p> <p>SSS486 The TCS HCI shall provide for visual Cautions and Advisories to be displayed at or near the center of the field of view, i.e., within a 30° cone, of all monitors in a TCS system.</p> <p>SSS485 The TCS HCI shall provide for separation, grouping, and visual coding of multiple categories of alerts, to include Warnings, Cautions, and Advisories.</p> <p>SSS484 The TCS HCI shall provide for a rapid means to cancel aural warnings.</p> <p>SSS482 The TCS HCI shall provide the capability to display operator definable "Lock Out" zones around waypoints, Launch and Recovery Point (LRP), or any selected point on the AV flight path.</p> <p>SSS481 The TCS HCI shall provide the capability to lock onto and hold a coordinate point on-screen.</p> <p>SSS480 The TCS HCI shall provide the on-screen capability to select and efficiently move or reorient a previously defined SAR imaging swath.</p>

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		<p>SSS479 The TCS HCI shall display the SAR imaging swath on the map display.</p>
		<p>SSS478 The TCS HCI shall provide coarse and fine payload control capabilities directly on the payload screen.</p>
		<p>SSS477 The TCS HCI shall provide the capability to select and amplify an object or point on a map or payload screen.</p>
		<p>SSS476 The TCS shall provide for a specific icon shape on a constant contrast background, or other visual information coding mechanisms, to cue the TCS operator regarding which UAVs are under his or her primary control.</p>
		<p>SSS475 The TCS HCI shall provide unambiguous AV and payload control and status feedback indicators to ensure safe, efficient operations of two AVs and their payloads by a single TCS station.</p>
		<p>SSS474 The TCS shall minimize alphanumeric data display in favor of graphic, pictorial information display</p>
		<p>SSS473 The TCS shall provide the necessary processing, display, and control capabilities to ensure dynamic situational awareness input to the TCS operator.</p>
		<p>SSS472 The TCS shall provide maximum automated system software support to system status monitoring and alerting of the TCS operator when a preset system parameter goes over threshold.</p>
		<p>SSS471 The TCS shall provide automated TCS system information, control options, and logical & simple operator guidance and support for immediate and adaptive responding to crisis situations.</p>
		<p>SSS470 The TCS shall provide for multi-level information display tailoring by the operator.</p>
		SSS469

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		The TCS shall use graphical representations to convey information, such as system status, C4I links, and AV-GDT links.
SSS468	Provide a capability for porting an off-the-shelf, complex control joystick with at least two X/Y control devices, multiple toggle and multi-position switches as part of the TCS hardware suite.	
SSS559	The TCS shall provide the functionality to have a maximum delay time of TBD from operator command to system acknowledgment and response.	
SSS467	The TCS shall provide for cursor polling (update) at a 33 or 50 ms rate, as well as rate aiding and fine positioning accuracy algorithms or mechanisms.	
SSS466	The TCS shall provide full complementary control operations either from the keyset or the X/Y control device (e.g., trackball, mouse, joystick).	
SSS465	The TCS shall be capable of displaying a window within a window format to include, as a minimum, displaying a video window overlaid on a map screen or a map screen overlaid on a video screen.	
SSS443	The TCS shall have ergonomically designed operator controls and displays for the 5th to 95th percentile male (female) operator.	
SSS444	The controls shall allow the air vehicle and payload operators to perform real time mission control, mission monitoring, and mission updates/modifications while wearing cold weather clothing or in a Mission Oriented Protective Posture.	
SSS461	The TCS shall facilitate Human-Computer Interfaces (HCIs) that support operation of all system modes, functions, and capabilities.	
SSS462	The Human Computer Interface (HCI) shall be designed and implemented in accordance with the HCI Design Approach for the UAV TCS document.	
		SSS463

ORD NUMBER	ORD REQUIREMENT	SSS REQUIREMENT AND NUMBER
		The HCI shall provide redundancy in all operations, so that the loss of any one HCI device does no prohibit operation of any TCS function. SSS464 The TCS shall provide the functionality to display all HCI elements on any available monitor on the TCS workstation.
ORD020	The TCS shall have monitor(s) that provide easy reading of displays.	SSS446 The TCS shall have monitor(s) that provide easy reading of displays under direct sunlight and low light level environments. SSS459 Display jitter and flicker shall not be detectable by the operator.
ORD021	The TCS HCI shall be menu driven and have displays in a X-windows motif.	SSS447 The TCS HCI shall be menu driven and have displays in a X-windows motif. SSS399 TCS software shall provide a windows based graphic operator interface.
ORD022	The TCS shall have peripheral ports to drive external devices. As a minimum, ports required will be for monitor displays, mouse (or pointer device), keyboard, printer, LAN, EIA-RS-170, and external disk drives (if required)	SSS343 The TCS shall provide a RAID for storage and retrieval of TCS data. SSS342 The TCS shall provide a tape drive for storage and retrieval of TCS data.
ORD023	The TCS shall be capable of supporting additional software modules for future payloads, payload capabilities (e.g. autosearch and automatic target tracking), and future tactical UAVs.	SSS439 A modular architecture shall be used by the TCS software in order to support future interoperability with multiple types of UAVs and payloads while maintaining consistent displays and user interfaces. Software components satisfying common planning and control functions will allow for vehicle specific components to be integrated in the future.
ORD024	The TCS shall allow operators to have simultaneous flight and payload control of at least two air vehicles, beyond line of sight, using one TCS.	SSS125 The TCS shall provide the necessary system capabilities required for air vehicle flight control beyond line of sight via uplink command to two air vehicles of the same type using sequential communication techniques. Sequential communication means alternatively communicating with one air vehicle and then the other. Current air vehicle design does not permit concurrent communications with two air vehicles at the same time. SSS124 The TCS shall allow the operator to control an AV using the LOS or SATCOM data links.

ORD NUMBER	ORD REQUIREMENT	SSS REQUIREMENT AND NUMBER										
		SSS149 The TCS shall provide the necessary system capabilities required for payload control beyond line of sight via uplink command of two air vehicles of the same type using sequential communication techniques. Sequential communication means alternatively communicating with one air vehicle and then the other. Current air vehicle design does not permit concurrent communications with two air vehicles at the same time.										
ORD025	The TCS shall be capable of being interoperable with different types of UAV payloads across the 5 levels of UAV interaction.	<p>SSS011 The TCS shall be capable of being interoperable with Predator and Outrider UAVs across the 5 levels of UAV interaction.</p> <p>SSS012 The TCS shall be capable of being interoperable with the installed payloads across the 5 levels of UAV interaction.</p> <p>SSS322 The TCS shall implement an AV Standard Interface that will provide the proper data format to ensure communications with the selected AV.</p> <p>SSS323 This interface shall allow for addition of future AVs and will provide the generic architecture to ensure interoperability.</p>										
ORD026	The TCS shall be capable of being interoperable with multiple platforms/payloads simultaneously.	<p>SSS013 Table 3-2 identifies the payloads with which the TCS shall interoperate.</p> <table> <caption>Table 3-2 Interoperable TCS Payloads</caption> <thead> <tr> <th>PAYOUTLOAD TYPE</th> <th>UAV</th> </tr> </thead> <tbody> <tr> <td>EO/IR</td> <td>Predator</td> </tr> <tr> <td>EO/IR</td> <td>SAR</td> </tr> <tr> <td>EO/IR</td> <td>Outrider</td> </tr> <tr> <td></td> <td>Future</td> </tr> </tbody> </table>	PAYOUTLOAD TYPE	UAV	EO/IR	Predator	EO/IR	SAR	EO/IR	Outrider		Future
PAYOUTLOAD TYPE	UAV											
EO/IR	Predator											
EO/IR	SAR											
EO/IR	Outrider											
	Future											
ORD027	The TCS shall be capable of meeting the operational and physical security requirements of the systems with which it is interoperable.	<p>SSS362 The TCS shall be accredited by the Designated Approving Authority prior to processing classified or sensitive unclassified data.</p> <p>SSS361 The TCS is an automated information system (AIS). As such, as per DoD Regulation 5000.2-R, dated March 15, 1996, the TCS shall meet security requirements in accordance with DoD Directive 5200.28(D), "Security Requirements for Automated Information Systems" dated March 21, 1988.</p>										

ORD NUMBER	ORD REQUIREMENT	SSS REQUIREMENT AND NUMBER
		<p>SSS363 These requirements pertain to the TCS computer hardware and software. Using risk assessment procedure defined in DoD 5200.28(D), a risk index and the minimum security requirements for TCS shall be determined. The inputs to this procedure are the clearance or authorization of the TCS users and the sensitivities of the data that the TCS processes, stores or transfers.</p>
		<p>SSS364 The TCS data sensitivities shall be determined by the data sensitivities of the systems with which it interfaces including the air vehicles, payloads, and C4I systems. The outputs of the procedure are the TCS mode of operation and a digraph that the TCS must minimally satisfy. The digraph (e.g., B1, C2) names the class of security requirements, specified in DoD 5200.28-STD, "Trusted Computer Security Evaluation Criteria (TCSEC)", that the TCS has to satisfy.</p>
		<p>SSS365 Links that provide communications between the TCS and other systems shall be secured in a manner appropriate for the sensitivities of the material passed through such links, in accordance with DoD Directive C-5200.5, "Communication Security (COMSEC)" dated 21 April 1990.</p>
		<p>SSS366 The TCS shall be designed to protect its communication and data links against enemy Electronic Warfare (EW) threats, physical anti-radiation weaponry and physical destruction.</p>
		<p>SSS367 All hardware, software, documentation, and sensitive information processed by TCS shall be physically protected, minimally at the level determined by the risk index computed in Section 3.8.1, to prevent intentional or unintentional disclosure, destruction, or modification.</p>
		<p>SSS368 The TCS shall be physically secured to the same degree as the systems with which it interfaces.</p>
		<p>SSS369 All TCS users, operators, maintainers and other personnel having access to TCS shall be cleared to the highest sensitivity of the data that the TCS processes, stores or transfers.</p>
		<p>SSS370 Additional local site procedures shall be developed to prevent the intentional or unintentional disclosure of sensitive information to unauthorized individuals.</p>
		<p>SSS371 A training program consisting of an initial security training and awareness briefing covering AIS security in general but also tailored to the TCS shall be developed.</p>

ORD NUMBER	ORD REQUIREMENT	SSS REQUIREMENT AND NUMBER
ORD028	The TCS shall be capable of importing NIMA Digital Terrain Elevation Data (DTED), Digital Feature Analysis Data (DFAD), Arc Digitized Raster Graphic and scanned hard copy maps.	SSS384 The TCS computer system shall contain a CD-ROM drive that is compatible with Defense Mapping Agency (DMA), CD-ROM Digital Terrain Elevation Data (DTED), Digital Feature Analysis Data (DFAD), and embedded training media.
		SSS341 The TCS shall provide a read and write CD drive for storage and retrieval of TCS data.
		SSS280 The TCS shall be capable of importing National Imagery Mapping Agency (NIMA) Digital Terrain Elevation Data (DTED), Digital Feature Analysis Data (DFAD), Arc Digitized Raster Graphic and scanned hard copy maps, via compact disk.
ORD029	The TCS shall be capable of importing map information via operator procedure and should be capable of incorporating vector format and Compressed ADRG (CADRG) maps.	SSS281 The TCS shall be capable of importing map information via operator procedure and should be capable of incorporating vector format and Compressed ADRG (CADRG) maps.
		SSS555 The TCS shall be capable of importing map information via operator procedure.
ORD030	The TCS shall include the basic flight planning tools. As a minimum these tools will include: 1. Weight and balance take off data calculations.	SSS083 The TCS flight route planner shall include, as a minimum, the following flight planning tools: 1. Weight and balance take off data calculations.
		SSS088 The TCS shall present to the operator the estimated time of arrival at each programmed waypoint of the proposed mission plan.
ORD031	The TCS shall include the basic flight planning tools. As a minimum these tools will include: 2. Fuel Calculations	SSS089 The TCS shall analyze the flight route plan selected for uplink to determine that the flight constraints of the AV and the limitation of the data link are not violated prior to transmission of the flight route plan to the AV.
ORD032	The TCS shall include the basic flight planning tools. As a minimum these tools will include: 3. Terrain avoidance warning and minimum reception altitude calculations for line of sight flights.	SSS084 The TCS flight route planner shall include, as a minimum, the following flight planning tools: 2. Fuel Calculations
		SSS085 The TCS flight route planner shall include, as a minimum, the following flight planning tools: 3. Terrain avoidance warning and minimum reception altitude calculations for line of sight flights.

ORD NUMBER	ORD REQUIREMENT	SSS REQUIREMENT AND NUMBER
		flights. SSS554 The TCS flight route planner shall include, as a minimum, the following flight planning tools: 4. Minimum data link reception altitude calculations for line of sight flights.
ORD033	The TCS shall include the basic flight planning tools. As a minimum these tools will include: 4. Payload search area information such as; visual acuity range due to atmospheric conditions; diurnal transition periods for thermal imagery, and lunar and solar terrain shadowing.	SSS086 The TCS flight route planner shall include, as a minimum, the following flight planning tools: 4. Payload search area information such as: visual acuity range due to atmospheric conditions; diurnal transition periods for thermal imagery, and lunar and solar terrain shadowing.
ORD034	The TCS shall be capable of providing point-and-click route and sensor planning.	SSS081 The TCS shall provide the capability to display mission waypoints and flight path graphically. SSS059 The TCS mission planning function shall provide a graphical user interface that gives the operator the ability to define waypoints on a map based display using pointing device commands. SSS092 The TCS shall provide the operator with an interactive graphics and map based flight route planning capability. SSS560 The TCS shall provide the capability to compute the range and bearing between two geographic positions located on the payload imagery display.
ORD035	The TCS shall program air vehicles with mission planning data prior to launch.	SSS561 The TCS shall provide the capability to compute the range and bearing between two geographic positions on the map display. SSS070 The TCS shall provide the system functionality necessary to perform flight route plan upload to the AV via the selected system data link or direct ground connection.
ORD036	The TCS shall have tools for importing or creating overlays for fire support coordination measures, airspace control measures, and threat.	SSS060 The TCS shall have the ability to import or create map display overlays for fire support coordination measures, airspace control measures, and threat identification measures. SSS087 The TCS flight route planner shall include, as a minimum, the following flight planning tools:

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		5. Ability to designate flight corridors and restricted air space. SSS547 The TCS shall have the capability to import as well as create and modify map display overlays for fire support coordination measures.
		SSS548 The TCS shall have the capability to import as well as create and modify map display overlays for airspace control measures.
ORD037	The TCS shall provide the following survivability mission planning features: a. Provide override of payload and AV automated/preprogrammed inputs.	SSS176 The operator shall be able to manually override the automatic frequency selection if desired. SSS174 The operator shall be able to manually override the automatic mode selection if desired.
		SSS163 The operator shall be able to manually override any automatic data terminal control mode selection if desired.
ORD038	The TCS shall provide the following survivability mission planning features: b. Provide a method of displaying aircraft signature versus threat, before and during flight.	SSS066 When available, the UAV signature lookup table shall support the capability of displaying aircraft signature versus threat, before and during flight. SSS065 Upon completion of radar cross section analysis and characterization for each UAV type, TCS shall implement a UAV signature versus threat lookup table (database) that identifies the lethality of the threat to the UAV.
ORD039	The TCS shall provide the following survivability mission planning features: c. The system should be capable of displaying overlays or icons of known threat systems and displaying the threat engagement envelopes and associated radar terrain masking for those threats for route planning.	SSS062 The TCS shall provide the capability of displaying the threat engagement envelopes and associated radar terrain masking for those threats. SSS064 An authorized Operator, via the Adjust Programmable Parameters capability, shall be able to modify the maximum number of threats displayed, when de-clutter is selected. SSS061 The TCS shall provide the capability of displaying overlays with up to 100 simultaneous icons

ORD NUMBER	ORD REQUIREMENT	SSS REQUIREMENT AND NUMBER
		of known threat systems.
		SSS549 The TCS shall provide the capability of displaying overlays each containing 100 simultaneous icons of known fire support coordination zones.
		SSS550 The TCS shall provide the capability of displaying overlays each containing 100 simultaneous icons of known airspace control zones
ORD040	The TCS shall be capable of storing mission plans and exporting them to other TCSs and exporting them to force level mission planning systems.	SSS056 The TCS shall have the functionality to transmit UAV mission plans to other TCSs. SSS055 The TCS shall have the functionality to transmit UAV mission plans to service-specific mission planning systems. SSS051 The TCS Mission plan shall include all necessary information required to be interoperable with the force level mission planning systems including the Tactical Automated Mission Planning System (TAMPS), Aviation Mission Planning System (AMPS), and Air Force Mission Support System (AFMSS). SSS054 The TCS shall have the functionality to receive UAV mission plans from other TCSs.
ORD041	The TCS shall be capable of downloading mission plans from Service-specific mission planning systems (e.g., Tactical Aircraft Mission Planning System and Air Force Mission Support System).	SSS058 The TCS shall be capable of storing a minimum of 500 mission plans under unique names to allow for later retrieval. SSS053 The TCS shall have the functionality to receive and process UAV mission plans from service-specific mission planning systems.
ORD042	The TCS shall be capable of changing the mission plan while the air vehicle is airborne.	SSS106 The TCS shall have the capability to receive a communications plan as part of a UAV Mission Plan from a service-specific mission planning system or another TCS.
ORD043	The TCS shall be ergonomically designed and provide sufficient cues to allow the pilot to	SSS070 The TCS shall provide the system functionality necessary to perform flight route plan upload to the AV via the selected system data link or direct ground connection. SSS063

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	safely take off, land, and navigate under Instrument Flight Rules.	A de-clutter capacity shall be provided that only displays the selected number of the most significant threats.
	SSS356	Upon detection of loss of link, the TCS shall attempt to reestablish communications with the air vehicle.
	SSS355	The TCS shall monitor the uplink and downlink to each UAV under its control.
	SSS353	The TCS shall be designed such that no single hardware failure or software error results in an unsafe command to be transmitted to and accepted by the air vehicle.
	SSS556	The TCS shall be designed such that no single software error results in an unsafe command to be transmitted to the air vehicle.
	SSS352	The TCS shall provide the required information to allow the operator to maintain safe separation from other aircraft and a safe altitude in civilian airspace per Federal Aviation Administration (FAA) rules.
	SSS351	During mission execution, the TCS shall provide the operator a caution/warning when the UAV system has identified a malfunction.
	SSS350	For mission planning, the TCS shall provide terrain avoidance warning and minimum reception altitude calculations for line of sight flights.
	SSS349	Appropriate caution/warning shall be provided to the operator if the air vehicle deviates into unsafe flight regime.
	SSS348	The TCS shall provide adequate capability to allow the operator to operate each UAV within its certified operational flight envelope.
	SSS347	The TCS shall provide sufficient cues to allow the operator to safely take-off, land and navigate under Instrument Flight Rules.

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ORD044	The TCS shall support an automatic launch and recovery system.	<p>SSS135 The TCS shall support an automatic launch and recovery system.</p> <p>SSS136 The TCS shall be interoperable with the Integrity Beacon Landing System (IBLS) used by Outrider.</p> <p>SSS138 The TCS shall present sufficient cues to the operator to implement and monitor automatic launch and recovery, and to initiate abort procedures if required.</p> <p>SSS289 The TCS shall provide external interfaces to required launch and recovery systems.</p> <p>SSS137 The TCS shall be interoperable with the Common Automated Recovery System (CARS) used by Outrider.</p>
ORD045	The TCS shall display the location and system status of the UAV.	<p>SSS143 The TCS shall display the AV status, to include but not be limited to the AV location and system status.</p> <p>SSS144 While the data link is not operational, the TCS shall present the last known AV status values and the time at which the last values were reported.</p> <p>SSS145 The TCS shall be capable of displaying fuel parameters to the operator to include as a minimum fuel status, flow rate, and bingo fuel.</p> <p>SSS146 The TCS shall compute the estimated position of the AV during Loss of Link (LOL) based upon the last known AV position projected along the flight planned route.</p> <p>SSS536 TCS shall display a LOL timer to the operator initiating a LOL onset.</p>
ORD046	The TCS shall display the search footprint of the payload on the moving map.	<p>SSS157 The TCS shall display the search footprint of the payload on the moving map.</p>
ORD047	The TCS shall provide dynamic mission and sensor relasking during operational mission	SSS067

ORD NUMBER	ORD REQUIREMENT	SSS REQUIREMENT AND NUMBER
	execution.	The TCS shall permit dynamic mission and sensor retasking during all phases of operational mission execution.
ORD048	The TCS shall receive, process, format, store, retrieve flight and payload data, and perform limited exploitation of payload data.	<p>SSS336 An RS-170A video interface shall be provided for the system to output and input analog imagery and overlays to and from a Video Cassette Recorder (VCR) for recording and playback.</p> <p>SSS334 The TCS shall allow the Operator(s) to fully control the VCR via the TCS Display input device(s).</p> <p>SSS198 RSI170A Video and digital imagery shall be routed to TCS functions and displayed upon operator request.</p> <p>SSS196 The TCS operator shall be able to select the content of the overlay information.</p> <p>SSS537 The TCS shall provide the capability to simultaneously view imagery as well as data from more than one payload, when applicable.</p> <p>SSS195 The TCS shall display live or recorded imagery data, with or without annotation or overlay, upon operator request. Annotation includes operator generated comments or graphics which are superimposed on the imagery. Overlays consist of information obtained from external sources that is selected by the operator for presentation with the imagery.</p> <p>SSS184 The TCS shall be able to store up to 24 hours of payload data. External storage can be utilized for this purpose.</p> <p>SSS182 The TCS shall have the functionality to process payload product data from Electro Optical (EO), Infrared (IR), and Synthetic Aperture Radar (SAR) payloads.</p> <p>SSS527 The TCS shall provide the system functionality necessary to record data obtained via the data link.</p> <p>SSS528 The TCS shall be capable of automatically recording system state data, interface</p>

ORD NUMBER	ORD REQUIREMENT	SSS REQUIREMENT AND NUMBER
ORD049	The TCS shall have the capability to receive data from and control payloads on a UAV that is being controlled from another TCS.	communications and other information necessary to support event reconstruction. SSS148 The TCS shall have the capability to receive data from and control payloads on an AV that is being controlled from another TCS.
ORD050	The TCS shall provide the capability to pass control of an AV from one TCS to another.	SSS114 The TCS shall provide the capability to pass control of an AV to another TCS or AV specific GCS. SSS115 The TCS shall provide the capability to take control of an AV from another TCS or AV specific GCS.
ORD051	The TCS shall provide the operator a caution/warning when the UAV system has identified a malfunction.	SSS458 All TCS HCI shall prompt the operator for a valid input if an erroneous entry is made. SSS455 The volume of these auditory tones shall be adjustable by the operator via keyboard and trackball input. SSS453 The position of the displayed message window shall be easily adjustable by the operator to ensure that important mission data is not obscured. SSS445 The TCS shall provide the operator a caution/warning when the UAV system has identified a malfunction. SSS448 When performing a given task during mission execution, the operator shall be given appropriate warning messages from other concurrently-executing subsystem tasks SSS449 TCS Warning messages shall be color coded and flashed based on mission criticality. The color codes and flash frequencies will follow MIL-STD 1472 guidelines SSS450 The TCS operator shall be required to enter an acknowledgement prior to disabling the display of critical warning flags for any AV, Payload, ADT, GDT, or TCS faults.

ORD NUMBER	ORD REQUIREMENT	SSS REQUIREMENT AND NUMBER
		<p>Visual alerts to the TCS operator shall be in the form of a displayed message box that has a display priority greater than other existing windows to ensure that it is viewable immediately by the operator.</p> <p>SSS454 In addition to displayed alert messages to the TCS operator, auditory alerts/tones shall also be provided.</p>
		<p>SSS456 All TCS warning messages and HCI actions shall be archived for later review.</p> <p>SSS457 All TCS operator inputs shall be error checked against reasonable minimum and maximum values such that any erroneous operator entry will not cause current processing to terminate.</p>
ORD052	The TCS shall enable antenna switching when the UAV is masked by obstructions.	<p>SSS116 For shipboard operations, the TCS shall provide the capability to switch to a second LOS antenna, if a second antenna is available, when the currently active antenna is masked by shipboard obstructions.</p> <p>SSS117 The TCS shall provide the capability to switch to a SATellite COMMunication (SATCOM) antenna, if the selected AV has SATCOM capability, when the AV proceeds beyond LOS range or when LOS is obstructed.</p>
ORD053	The TCS shall provide limited exploitation capabilities, to include voice and textual reporting for spot/mission objectives.	<p>SSS200 The TCS shall have the functionality to conduct limited exploitation on the payload product data. Limited exploitation, as a minimum, will include image enhancement, annotation, and graphic overlay.</p>
ORD054	The TCS capabilities shall include video/SAR frame grabbing, image annotation, image archiving, video/SAR recording playback, and data dissemination.	<p>SSS330 The TCS shall provide an internal interface for the SAR Processor in order to disseminate SAR information (to include imagery and telemetry) to other components of the TCS.</p> <p>SSS202 The TCS shall provide the capability to capture frozen-frames of imagery and store a limited number of these frozen images for further review or processing.</p> <p>SSS190 This functionality, as a minimum, shall include: correlating, formatting, storing, internally routing, and recording the video.</p>

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		SSS191 This functionality, as a minimum, shall include; creating and storing a freeze frame of the video.
ORD055	The TCS shall be in compliance with Common Imagery Ground Surface Station (CIGSS), United States Imagery Standards (USIS), and GCCS when processing payload imagery data.	SSS192 This functionality, as a minimum, shall include; retrieving and displaying the video. SSS408 The TACCOM segment shall provide APIs for the transmission of imagery in National Imagery Transmission Formats 1.1a and 2.0 as per MILSTD-2500 and in accordance with the Common Imagery Ground/Surface Station (CGIS) Guidelines.
		SSS186 The NTIF 2.0 imagery files generated by the TCS shall contain the necessary telemetry and support data to permit subsequent imagery exploitation by C4I systems.
		SSS185 The TCS shall be in compliance with Common Imagery Ground Surface Station (CIGSS), United States Imagery Standards (USIS), National Imagery Transmission Format (NITF) Version 2.0 and Global Command Control Systems (GCCS) when processing payload imagery data.
ORD056	The TCS shall have the capability to display Near-Real Time (NRT) imagery with annotation to include date/time group, target location when in the center field of view, north seeking arrow, AV position and heading.	SSS207 The TCS shall have the functionality to determine the location of items of interest within the payload field of view, and express these locations in coordinates acceptable for military applications.
		SSS206 The TCS shall support a target location function where the operator can request the current ground location of the payload field-of-view center.
		SSS203 The TCS shall have the capability to display Near-Real Time (NRT) imagery with overlays to include, as a minimum, date/time group, target location coordinates when the target is in the center of the field of view, north seeking arrow, and AV position and heading.
ORD057	The TCS shall have a built-in word processing and text capability including the ability to overlay textual information on imagery.	SSS187 The TCS shall have a built-in word processing and text capability including the ability to annotate textual information on imagery.
ORD058	The TCS shall have ports for outputting data and imagery to a hard copy printer and recording media.	SSS338 The TCS shall, as a minimum, allow Operator(s) to print freeze-frame video, C4I Messages, Mission Plans, and FDL information. SSS337

ORD NUMBER	ORD REQUIREMENT	SSS REQUIREMENT AND NUMBER
		<p>The TCS shall have ports for outputting data and imagery to a hard copy printer.</p> <p>The TCS shall have ports for outputting data and imagery to recording media.</p> <p>SSS314 The TCS shall provide an interface between the TCS and an external hard copy printer.</p>
		<p>SSS315 The TCS shall as a minimum, allow Operator(s) to print freeze-frame video, C41 Messages, Mission Plans, and FDL information.</p>
		<p>SSS316 The TCS shall have the functionality to output digital message data and imagery to a hard copy printer.</p>
		<p>SSS193 This functionality, as a minimum, shall include: printing a hard copy of freeze frame video.</p>
		<p>SSS340 The TCS shall have the functionality to transfer digital data or digital imagery to and from external data storage devices.</p> <p>SSS339 The TCS shall be able to access data storage devices.</p>
		<p>SSS317 The TCS shall provide an interface between the TCS and external data storage systems.</p>
		<p>SSS318 The TCS shall have the functionality to transfer digital data or digital imagery to and from external data storage systems.</p>
		<p>SSS226 The TCS shall have the capability to distribute NRT video to selected users (including commercially available television monitors and VCRs) via external ports.</p> <p>SSS219 1. Send and receive analog imagery in RS-170A format with or without overlay.</p> <p>SSS228 2. The TCS shall export and disseminate RS-170A video with or without overlay.</p> <p>3. Establish and terminate analog communication to peripheral devices.</p>

ORD NUMBER	ORD REQUIREMENT	SSS REQUIREMENT AND NUMBER
ORD061	The TCS shall have image enhancement capability.	SSS201 The TCS shall have image enhancement capability to include contrast, brightness, edge enhancement, and sharpness.
ORD062	The TCS shall have the capability to select/deselect cross hairs (or other similar ICON) to identify center of target.	SSS197 The TCS shall have the capability to select and deselect cross hairs (or other similar ICON) to identify center of target.
ORD063	The TCS shall have the capability to display target symbols in variable sizes.	SSS212 The TCS shall have the capability to interoperate with a data server to receive, extract, and push intelligence data.
ORD064	The TCS shall have the capability to interoperate with a server to receive, extract, and push intelligence data.	SSS374 The hardware of the TCS shall be capable of being scaled as well as being modular to meet the varying needs of the Services.
ORD065	The TCS must support a simultaneous uplink and downlink capability.	SSS382 The TCS shall have sufficient throughput to support the processing requirements the selected data link.
		SSS325 The TCS shall support a concurrent uplink and downlink capability.
		SSS324 The uplink and downlink information passed between the TCS and the AV shall be in accordance with the associated AV documentation.
		SSS111 TCS shall receive AV telemetry and payload video information via downlink from the AV.
		SSS110 TCS shall uplink command and control information to the AV via the uplink to the AV.
ORD066	The TCS datalink shall provide interfaces with the respective UAV program-provided data links for command and control and UAV data.	SSS312 The TCS shall provide interfaces with the respective UAV program-provided data links for command and control and UAV data.
ORD067	The TCS datalinks shall comply with CDL standards to ensure interoperability.	SSS379 The TCS hardware shall support the data rate characteristics of the AV, data link and payload to ensure interoperability.

ORD NUMBER	ORD REQUIREMENT	SSS REQUIREMENT AND NUMBER
ORD068	The TCS datalink shall support a simultaneous LOS and beyond LOS capability.	SSS313 The TCS shall have provisions for supporting both of the following external interfaces: LOS data link, SATCOM data link.
ORD069	The TCS shall be interoperable with C4I systems listed in the ORD.	SSS406 The TACCOM segment shall provide a consistent and common set of interfaces for United States Military Transmission Format (USMIF), Army Tactical Command Control System (ATCSCS), and Field Artillery Tactical Data Systems (FATDS) message sets. TACCOM shall also provide National Imagery Transmission Format (NITF) and system specific interfaces.
		SSS222 The TCS shall have the functionality to provide the following control capability: 1. Send and receive tactical communication messages
		SSS223 The TCS shall have the functionality to provide the following control capability: 2. Send and receive annotated and un-annotated digital imagery
		SSS224 The TCS shall have the functionality to provide the following control capability: 3. Establish and terminate digital communication to the C4I systems specified in Section 3.2.5.
		SSS225 The TCS shall have the functionality to provide the following control capability: 4. Establish and terminate digital communication to peripheral devices.
		SSS227 The TCS shall have the functionality to provide the following control capability: 2 Establish and terminate analog communication to C4I systems specified in Section 3.2.5.
		SSS239 The TCS shall have the functionality to monitor the status of all C4I interfaces, and display appropriate control information.
		SSS240 The TCS shall have the functionality to provide the following data monitoring capability: 1. Determine which C4I systems are available and online
		SSS241 The TCS shall have the functionality to provide the following data monitoring capability:

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		<p>2. Monitor the status of all incoming and outgoing tactical communication messages</p> <p>SSS242 The TCS shall have the functionality to provide the following data monitoring capability: 3. Review all tactical communication messages received or transmitted</p>
		<p>SSS243 The TCS shall have the functionality to provide the following data monitoring capability: 4. View either incoming or outgoing, annotated or unannotated analog imagery</p> <p>SSS244 The TCS shall have the functionality to provide the following data monitoring capability: 5. View either incoming or outgoing, annotated or unannotated digital imagery</p>
		<p>SSS290 For external communications to C4I systems the TCS shall utilize Tactical Communications (TACCOM) which will consist of a set of software modules accessed through an Application Programming Interface (API).</p> <p>SSS407 The TACCOM segment shall provide external interfaces for the communications media as indicated in Table 3.10.4-1:</p>
ORD070	The TCS shall have the capability to connect to a local area network.	<p>SSS288 The TCS shall provide the system functionality to allow interfacing with external systems via a local area network.</p>
ORD071	The TCS shall have the capability to use cable to deliver live video imagery in multiple locations.	<p>SSS213 The TCS shall have the capability to use cable to deliver live video imagery in multiple locations.</p>
ORD072	The TCS shall have the ability to use Service specific ground or airborne UHF, VHF, and UHF/VHF, and HF radios for digital message transmission while using the same radios for record traffic.	<p>SSS214 The TCS shall have the ability to use Service specific ground or airborne Ultra High Frequency (UHF), Very High Frequency (VHF), and UHF/VHF, and High Frequency (HF) radios for digital message transmission while using the same radios for record traffic.</p>
ORD073	The TCS shall meet the mission capability criteria established by the MAE UAV and TUAV ORDs.	<p>SSS413 The TCS equipment shall achieve an availability (Ao), as defined below, equal to or greater than that which is specified in the Predator and Outrider ORDs.</p> <p>SSS411 The TCS maintainability will be considered in every phase of the design and development</p>

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		process and shall achieve a system maintainability (Mean Time To Repair MTTR) equal to or greater than that which is specified in the Predator and Outrider ORDs. SSS410 The TCS reliability will be considered in every phase of the design and development process and shall achieve a system reliability (Mean Time Between Failures MTBF) equal to or greater than that which is specified in the Predator and Outrider ORDs.
		SSS008 The TCS shall meet the capability criteria, those applicable to the TCS project, established by the Predator ORD and the Outrider ORD.
ORD074	For each TUAV system, the TCS shall provide full independent computer redundancy.	SSS380 For each TUAV system, the TCS shall provide full independent computer redundancy
ORD075	The TCS shall be maintained in accordance with the UAV ORD for that Service and the level of repair analysis for the hardware chosen.	SSS509 The TCS shall be maintained in accordance with the UAV ORD for that Service and the level of repair analysis for the hardware chosen.
ORD076	The TCS shall meet the deployment criteria for the organic unit to which it is assigned.	SSS516 The TCS shall meet the deployment criteria for the organic unit to which it is assigned. SSS523 The TCS shall be sea transportable. SSS522 The TCS shall be air transportable by helicopter (CH-47/CH-53D) and C-130 drive-on/drive-off capable. SSS525 The TCS shall be configurable for sea, ground, or air transport in 2 hours or less. SSS526 The TCS system shall be capable of being de-configured from sea/ground/air transport and ground-mobile in 2 hours or less.
ORD077	The TCS shall use standard military worldwide 110/220 volt 50/60 hertz generators and commercial power sources.	SSS385 The TCS shall use standard military worldwide 110/220 volt 50/60 hertz generators and commercial power sources.
ORD078	The TCS shall use standard electrical power sources available within the DOD family of ground mobile, airborne, and shipboard electrical power sources.	SSS386 The TCS shall use standard electrical power sources available within the DOD family of ground

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		mobile, airborne, and shipboard electrical power sources.
ORD079	The TCS shall be capable of restoring power in sufficient time to avoid loss of critical mission data or loss of air vehicle control during power outages.	<p>SSS319 The TCS shall have an interface between the TCS and DoD standard power supply equipment.</p> <p>SSS320 The TCS shall have the functionality to connect to the power supply equipment provided in the TCS operating environment.</p> <p>SSS354 The TCS shall be capable of restoring power in sufficient time to avoid loss of air vehicle control during power outages.</p>
ORD080	The TCS shall have an uninterrupted power supply for critical phases (landing and takeoff as a minimum) of mission execution.	<p>SSS387 The TCS shall be capable of restoring power in sufficient time to avoid loss of critical mission data or loss of air vehicle control during power outages.</p> <p>SSS344 The TCS shall have an interface to an uninterruptible power supply.</p>
ORD081	The TCS shall have an objective capability to be integrated and operated from tactical and command and control aircraft and submarines.	<p>SSS388 The TCS shall have an uninterrupted power supply for critical phases (landing and takeoff as a minimum) of mission execution.</p> <p>SSS534 The TCS shall have the capability to be integrated and operated from ships.</p> <p>SSS533 The TCS shall have the capability to be integrated and operated from land based platforms.</p> <p>SSS531 The TCS shall have the capability to be integrated and operated from tactical and command and control aircraft.</p> <p>SSS532 The TCS shall have the capability to be integrated and operated from submarines.</p>
ORD082	The TCS shall operate in world wide climatic conditions, i.e. same climatic conditions in which the TCS shelter/platform is designed to operate.	<p>SSS372 The TCS shall be capable of operation within environments specified for the land-based shelter and shipboard environments.</p> <p>SSS435</p>

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ORD083	A TCS support and fielding package shall be developed and available for operational testing.	The TCS shall be compatible with the external electromagnetic environment. SSS510 A TCS support and fielding package shall be developed and available for operational testing.
ORD084	The TCS shall be maintained in accordance with Services' approved UAV maintenance concepts and procedures.	SSS511 The TCS shall be maintained in accordance with Services' approved UAV maintenance concepts and procedures.
ORD085	Support for the TCS shall be in accordance with the Integrated Logistical Support Plan (ILSP) and the maintenance concepts and policies of the individual Services.	SSS504 SSS512 Support for the TCS shall be in accordance with the Integrated Logistical Support Plan (ILSP) and the maintenance concepts and policies of the individual Services.
ORD086	Standard tools, TMDE, repair parts, and lubricants shall be used to maintain the TCS.	SSS507 Standard tools, TMDE, repair parts, and lubricants shall be used to maintain the TCS. Exceptions shall be considered on a case by case basis.
ORD087	To the maximum extent possible, general purpose test equipment (GPTE) and common tools resident in each service shall be used to perform all corrective and preventative maintenance at all authorized levels of maintenance.	SSS512 To the maximum extent possible, general purpose test equipment (GPTE) and common tools resident in each service shall be used to perform all corrective and preventative maintenance at all authorized levels of maintenance.
		SSS513 Tools and test equipment required to maintain the TCS but not resident in each service inventory shall be identified as special tools and special purpose test equipment (SPTE), respectively, and kept to a minimum.
ORD088	Tools and test equipment required to maintain the TCS but not resident in each service inventory shall be identified as special tools and special purpose test equipment (SPTE), respectively, and kept to a minimum.	SSS025 Initialization of the TCS shall include execution of Startup FD/L.
ORD089	The TCS hardware and software shall include FD/L during initial computer system boot-up.	SSS024 When executing in the Normal Startup Mode, the TCS shall provide the system functionality necessary to execute the Startup Fault Detection Logic (FD/L) and initialize the system to place it in the Operations State within 60 seconds. SSS249 Fault Detection/Location (FD/L) to the Line Replaceable Unit (LRU) level shall be provided to indicate the readiness status of TCS.

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		SSS250 As a minimum, TCS shall provide FDL as part of normal Startup Mode, periodically during Normal Operations and Training Modes, and extensively, if selected, as part of Maintenance Mode.
		SSS036 The TCS hardware and software shall execute periodic Fault Detection Logic (FDL) while in the Normal Operations Mode and Training Mode, to include a periodic determination of level of interaction.
ORD090	The TCS manpower requirements shall not exceed the Services' guidelines for their respective UAV Program.	
ORD091	TCS training shall be balanced between institutional, New Equipment Training (NET), and unit training.	
ORD092	TCS instructor and key personnel training shall be required.	
ORD093	TCS units shall receive NET as new system equipment is fielded.	
ORD094	TCS training devices shall be required for the institutional training base.	
ORD095	TCS unit training shall be conducted in both garrison and field environments -- individual and collective modes.	SSS491 TCS training and training support shall include the processes, procedures, techniques, training devices and equipment to train civilian, active duty and reserve military personnel to operate and support the TCS system. This will include: individual and crew training; new equipment training; initial, formal, and on-the-job training. TCS training will strike a balance between institutional, new equipment and unit training.
ORD096	The TCS system shall provide, for the operator and maintainer, the capability for incorporation of embedded / add-on interactive training with self-paced instruction, duplicating UAV flight performance characteristics, capabilities, and limitations.	SSS492 The TCS system shall provide, for the operator and maintainer, an embedded or add-on interactive training courseware with self-paced instruction, duplicating UAV flight performance characteristics, capabilities, and limitations.
		SSS402 Training software shall be alterable without affecting the configuration of the operational software.
		SSS494 The interactive courseware training capability for TCS shall be developed during Phase I and introduced to the user during scheduled demonstrations and tests.
		SSS495 The training capability for performance of TCS functions shall include primary mission (flight route/payload) planning, mission control and monitoring, imagery processing, tactical

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		communications, AV control communications and TCS system on line diagnostics. This capability will be qualified and improved during Phase I based upon use and feedback from qualified operators and users demonstrating TCS system equipment throughout Phase I. Instructional support materials and training courseware for classroom discussion and lecture will be developed to support institutional, new equipment training and unit training.
SSS496	The TCS shall provide the functional capability to train personnel in the operation of the TCS system, performance of TCS UAV functions, and on-line system troubleshooting.	
SSS497	TCS system training shall include system architecture, component familiarization, and system startup, initialization, system recovery, on-line diagnostics, and shutdown.	
SSS501	Training shall be adequate to maintain operator and maintainer skills and proficiencies.	
SSS502	TCS shall record operator and maintainer actions for self assessment and performance enhancement.	
SSS503	Operator and maintainer performance shall be measurable using parameters retrievable from the TCS to determine proficiency levels.	
ORD097	The TUAV TCS system shall be compatible with the U.S. Army Intelligence and Electronic Warfare Tactical Proficiency Trainer (Multiple UAV Simulation Environment) as an objective.	SSS493 The TUAV TCS system shall be compatible with the U.S. Army Intelligence and Electronic Warfare Tactical Proficiency Trainer as an objective.
ORD098	All TCS Operator Manuals and Technical Manuals shall be verified and validated prior to initial operational test.	SSS529 All TCS Operator Manuals and Technical Manuals shall be verified and validated prior to initial operational test.
ORD099	TCS system safety and health hazards, if any, shall be identified and evaluated.	SSS359 System safety and health hazards, if any, shall be identified and evaluated. SSS357 The TCS design shall provide protection against injury to TCS operators and maintenance personnel. SSS345 The TCS design solution shall consider all safety requirements affecting design and performance

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		except nuclear safety.
		SSS436 The TCS design shall ensure that personnel, fuel, and ordnance are not exposed to electromagnetic radiation.
		SSS358 The TCS system design shall use MIL-STD-2036, Section 5.1.3.11 as a guide, with regard to personnel hazards, and MIL-STD-1472D, Section 5.13, as a guide for safety from a human engineering viewpoint.
ORD100	TCS risk levels and a program to manage the probability and severity of hazards shall be developed.	SSS360 Risk levels and a program to manage the probability and severity of hazards shall also be developed. SSS346 The TCS safety requirements are intended to eliminate or control potential hazards to equipment and personnel involved in the TCS. The TCS shall comply with para 5.3 of MIL-STD 882C, "System Safety Program Requirements", dated 19 January 1993 w/Notice 1 dated 19 January 1996.
ORD101	The TCS shall conform with the National Institute for Standard Technology (NIST) Federal Information Processing Standard (FIPS) Publication 151-2 (POSTX.1)	SSS381 The TCS shall conform with the National Institute for Standard Technology (NIST) Federal Information Processing Standard (FIPS) Publication 151-2 (POSIX.1)
ORD102	The TCS shall be capable of providing a 50% spare memory storage capacity over delivered storage used.	SSS391 The TCS shall be capable of providing a 50% spare memory storage capacity over delivered storage used.
ORD103	A 75% spare memory storage capacity over storage used is desired.	SSS392 The TCS shall be capable of providing a 75% spare memory storage capacity over storage used (objective).
ORD104	To meet growth requirements, the TCS should be capable of adding additional storage without a major hardware reconfiguration.	SSS383 To meet growth requirements, the TCS shall be capable of adding additional storage without major hardware reconfiguration.
ORD105	The TCS throughput shall not exceed 50% of throughput capability delivered. Throughput should not exceed 25% of throughput capability delivered (objective).	SSS390 The TCS throughput shall not exceed 25% of throughput capability delivered (objective). SSS389 The TCS throughput shall not exceed 50% of throughput capability delivered.

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		<p>SSS415 The processing speed of each processor shall be such that at least 50% of the throughput of each processor remains unused during all 10 second periods and at least 20% of the throughput of each processor remains unused during all one second periods regardless of the system function performed.</p>
		<p>SSS416 The I/O channel reserve capability for each processor shall have at least a 50% reserve, addressable and useable, I/O channel capacity.</p>
ORD106	The TCS shall comply with the Assistant Secretary of Defense (C3I) Joint Technical Architecture (JTA). This includes, but is not limited to, the language, the computer, database, architecture, and interoperability.	<p>SSS394 The TCS shall comply with the Assistant Secretary of Defense (C3I) Joint Technical Architecture (JTA). This includes, but is not limited to, the language, the computer, database, architecture, and interoperability.</p>
ORD107	The TCS hardware shall be mounted and/or ruggedized to withstand inter and intra theater movement.	<p>SSS373 The TCS hardware shall be mounted and/or ruggedized to withstand inter and intra theater movement.</p>
ORD108	TCS containers must be reusable and enable the operators to set-up equipment within the established timelines in their ORDs.	<p>SSS505 TCS transport and storage containers shall be reusable and enable the operators to set-up equipment within the established timelines in their ORDs.</p>
ORD109	The TCS shall support direct connectivity to standard DOD tactical (VHF, UHF, and UHF/VHF) radios, Mobile Subscriber Equipment, and military/commercial satellite communications capabilities.	<p>SSS285 The TCS shall provide the capability to interface with equipment necessary to provide connectivity with standard DOD tactical (VHF, UHF, and UHF/VHF) radios, Mobile Subscriber Equipment, and military and commercial satellite communications equipment.</p>
ORD110	The TCS shall be capable of entering DII-COE compliant (C4I) networks. Network interoperability shall include, but not be limited to:	<p>SSS291 The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with ASAS. The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.</p>
	1. Radio data burst connectivity to Automatic Target Hand-off Systems (ATHS)	
	2. Advanced Field Artillery/Tactical Data Systems (AFATDS)	
	3. Army Deep Operations Coordination System (ADOCs)	
	4. Wire connectivity to the All Source Analysis System (ASAS)	
	5. The Intelligence Analysis System (IAS)	
	6. The Joint Standoff Target Attack Radar System (JSTARS) Ground Station Module/Common Ground Station (GSM/CGS)	
	7. The Joint Maritime command Information System (JMCIS)	
	8. Closed Circuit Television (CCTV)	
	9. Advanced Tomahawk Weapons Control Station (ATWCS)	
	10. Joint Deployable Intelligence Support System (IDISS)	
		<p>SSS292 The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with JSTARS GSM Version TBD. The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.</p>

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	11. Trojan Special Purpose Integrated Remote Intelligence Terminal (SPIRTI) 12. Joint Service Imagery Processing System (JSIPS) 13. JSIPS Tactical Exploitation Group (JSIPS TEG) 14. JSIPS Tactical Exploitation System (JSIPS TES) 15. Service Mission Planners 16. The Theater Battle Management Core System (TBMC) 17. The Guardrail Common Sensor/Aerial Common Sensor (GCS/ACS) Integrated Processing Facility 18. Modernized Imagery Exploitation System (MIES) 19. Enhanced Tactical Radar Correlator (ETRAC) 20. Contingency Airborne Reconnaissance System (CARS) 21. Common Operational Modeling, Planning, and Simulation System (COMPSS)	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with JMCLIS Version TBD. The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD. SSS294 The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with JSIPS Version TBD. The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD. SSS295 The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with AFATDS Version TBD. The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD. SSS296 The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with ADCS Version TBD. The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD. SSS297 The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with CARS Version TBD. The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD. SSS298 The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with CCTV Version TBD. The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD. SSS299 The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with CIS Version TBD. The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.

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		The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with GCS/ACS Version TBD. The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.
SSS301	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with JDISS Version TBD. The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.	
SSS302	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with 1SIPS TES Version TBD. The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.	
SSS303	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with IAS Version TBD. The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.	
SSS304	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with ATHS Version TBD. The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.	
SSS305	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with ATWCS Version TBD. The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.	
SSS306	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with Trojan Spirit II Version TBD. The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.	
SSS307		

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		The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with TBMCS Version TBD. The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.
SSS308	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with MIES Version TBD. The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.	
SSS309	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with ETRAC Version TBD. The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.	
SSS310	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with COMPSS Version TBD. The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.	
SSS311	The TCS shall provide the necessary hardware and software functionality to allow the TCS to integrate with JSIPS TEG Version TBD. The interface requirements and specifications will be defined in the Tactical Control System (TCS) to C4I Interface Design Description (IDD) Document - TCS Document Control Number (DCN) TBD.	
SSS286	The TCS shall interface with external mission tasking systems (e.g., receive tasking orders, coordination of mission certification).	
ORD111	The TCS shall be transported into the theater as an organic component of the operational UAV system being deployed.	SSS5177 The TCS shall be transported into the theater as an organic component of the operational UAV system being deployed.
ORD112	TCS transportation in theater for Army and Marine Corps systems shall be by ground transport, air, or rail.	SSS518 TCS transportation in theater for Army and Marine Corps systems shall be by ground transport, air, or rail. SSS521

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		The TCS shall be ground transportable.
		The TCS shall be air transportable
		SSS524 The TCS shall be rail transportable.
ORD113	For the Air Force, TCS transportation to the theater shall be by air.	SSS519 For the Air Force, TCS transportation to the theater shall be by air. The TCS shall be air transportable
ORD114	Within the theater, the USAF GCS shall be capable of being moved around an established air field.	SSS520 Within the theater, the USAF GCS shall be capable of being moved around an established air field. The TCS shall be air transportable
ORD115	Basing for the system will follow the plan for UAV units and service command echelon requirements as delineated in paragraph 6 below.	SSS515 Basing for the system shall follow the plan for UAV units and service command echelon requirements as delineated in the ORD.
ORD116	TCS data burst messages shall comply with Variable Message Formats.	SSS215 Where applicable, TCS data burst messages shall comply with Variable Message Formats.
ORD117	The TCS shall adhere to DOD regulations and policy governing military standards for logistics, POL, tools, TMDE, and other support items.	SSS506 The TCS shall adhere to DOD regulations and policy governing military standards for logistics, Petroleum, Oil and Lubricants (POL), tools, Test, Measurement, and Diagnostic Equipment (TMDE), tools, and other support items.
ORD118	The TCS shall require support from NIIMA for digitized map displays with elevation data.	SSS514 The environmental support required by the TCS shall be the same as that required for the respective UAV System.
ORD119	The environmental support required by the TCS shall be the same as that required for the respective UAV System.	SSS514 The environmental support required by the TCS shall be the same as that required for the respective UAV System.